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NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

MEASURING THE VALUE OF GRADUATE MANPOWER SYSTEMS ANALYSIS EDUCATION FOR NAVAL OFFICERS

by

Lindsay M. O'Sullivan

June 2006

Co- Advisors: Stephen Mehay
Alice Crawford

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MEASURING THE VALUE OF GRADUATE MANPOWER SYSTEMS ANALYSIS EDUCATION FOR NAVAL OFFICERS

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Submitted in partial fulfillment of the
requirements for the degree of

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This thesis examines methods to assess the value of the Manpower Systems Analysis (MSA) Curriculum at the Naval Postgraduate School. What exactly does the Navy get in return from the MSA curriculum graduates? Is the return on investment simply an increase in 'Quality of Life,' thus increasing retention? Or does the MSA curriculum teach graduates the necessary skills for follow-on billets? Individuals in the private and public sections have tried to quantify the value of both training and education. However, currently most measures of effectiveness are based purely on financial aspects of the education. Little has been done to capture the result of the investments in human capital on any part of the organization. The result of this research is the creation of two surveys that will be used as vehicles to access the value of the MSA curriculum to the Navy and to the graduate. The surveys created are for MSA graduates and their immediate supervisors. This research identifies specific measures and survey techniques that can be used to evaluate education and training. In the future, this approach can be applied to other curricula.

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LIST OF ACRONYMS

Term	Definition
CNO	Chief of Naval Operations
GEV	Graduate Education Voucher
MPT&E	Manpower, Personnel, Training & Education
MSA	Manpower Systems Analysis
N1	Deputy Chief of Naval Operations for Manpower and Personnel
N14	Strategic Planning and Analysis Directorate
NHROC	Navy Human Resource Officer Community
NPS	Naval Postgraduate School
ROI	Return on Investment
SEP	Special Education Program
TA	Tuition Assistance

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I. INTRODUCTION

This research develops an instrument that can be used to measure the perceived value of the Manpower Systems Analysis (MSA) curriculum in the Graduate School of Business and Public Policy at the Naval Postgraduate School. In order to understand the MSA curriculum, first one needs to examine the history of the Navy's Human Resource Officer Community, one of the main stakeholders in the MSA graduate education program. It is also important to look at the detailing process for officers holding a graduate degree, and some general background on graduate education in the military. Finally, this chapter discusses the goals of the surveys and outlines the research questions that this study addresses.

A. EVOLUTION OF THE NAVY'S HUMAN RESOURCE COMMUNITY

The Navy's Human Resource Officer Community is fairly new in its current form. It has gone through a series of changes, redesignations, and restructuring. In 1972, in reaction to the Combat Exclusion Law, which barred women from serving in most Navy billets, the surface, submarine, and aviation warfare Unrestricted Line (URL) communities were created. (FitzPatrick, 1998, p.11) The officers who remained were primarily women and a small number of male attrites from other officer communities (due to poor health or performance). (FitzPatrick, 1998, p.11) This group of non-warriors was called the General Unrestricted Line (GenURL) community (designator 1100). This community consisted of the Navy's fleet support officers, which included manpower and personnel specialists. With the establishment of the community, the Navy's first human resource officers were created with the following mission statement:

> The mission of the General Unrestricted Line Community is to provide the Navy with a community of Officers of proven leadership, shore management and subspecialty expertise who manage the increasingly complex fleet support establishment in direct support of the Navy's war fighting mission. (Barber, 2003, p.9)

Even though the community was formally recognized and had an assigned mission statement, it still experienced problems. The community was seen by many as just a place where women officers could serve, with no real purpose or value to the Fleet. (Barber, 2003, p. 9)

The community yet again transformed in 1994, with the establishment of the Fleet Support Officer (FSO) Community. Each of the 1100 GenURL, officers was re-designated into the 1700 community. The FSOs had the three "core competencies" of Logistic Support, Space and Electronic Warfare, and Manpower, Personnel and Training (MPT). (Barber, 2003, p.10) This conversion only lasted for a short time because in 1999, all 1700 FSO officers were converted back to GenURL, 1100 officers, again in part due to community credibility issues. (Barber, 2003, pp.14-15)

In 2001, the Human Resource Officer Community (NHROC), as it is today, was established. Each of the 329 Human Resources (HR) Officers, who started the 1200 community was selected via a Special Transition Board. This community was created "to meet the growing demands for specialized skills in human resource strategy and analysis." [1] (Barber, 2003, p.17) Although the community is still battling with the URL communities to be recognized as a legitimate asset to the fleet, the community mission and career progression is less ambiguous. Today the NHROC community:

> Provides life-cycle management of Navy people through requirements determination, force shaping, recruitment and selection, inventory management, and workforce training and development. (NPS 2006)

The Human Resource Community is an active participant in supporting the war effort. According to RADM Crisp, the highest ranking HR officer, the 1200 officers' expertise have been invaluable during the Global War on Terrorism (GWOT), the Quadrennial Defense Reviews (QDR), Manpower, Personnel, Training and Education (MPT&E) alignment, and development of the Human

[1] For further information on the history of the 1200 Navy Human Resources Community refer to NPS theses written by Barber Jr., Harry C. (2003) and FitzPatrick, Erick L. (1998).

Capital Strategy, and Task Force Total Force (TFTF). (Crisp 2005) With Navy senior leadership turning to HR officers for guidance in HR-related subjects, and the HR field changing so quickly, the importance of graduate education continues to increase in order to have specialists who are knowledgeable about the latest HR practices.

B. BACKGROUND OF GRADUATE EDUCATION IN THE NAVY

In 1990, the Department of Defense (DoD) issued a "Policy on Graduate Education for Military Officers." This directive established the importance of graduate education for military officers and provided a DoD-wide policy for funding of higher education. The directive was written in an effort to "Raise the levels of individual military officer professionalism and technical competence so that those officers more effectively perform their required duties and responsibilities." (DODD 1322.10) After the written directive was issued, each of the military services placed an increasing emphasis on graduate education. Evidence of this importance can be seen by each of the services' issuance of their own graduate education instructions.

Following the guidance on graduate education outlined by DoD, the Navy's instruction identifies the need for officers with specific subspecialty education gained through graduate education. The instruction also addresses the recruiting and retention benefits that are created by funded graduate education. Graduate education can be achieved through a series of programs in the Navy. Officers can be selected for a fully funded gradate program, or can pursue further education through different partially funded or fully funded programs including: the Navy Campus, Tuition Assistance (TA), the Montgomery GI Bill, or a Graduate Education Voucher (GEV).

1. NHROC Graduate Education

Earning a master's degree early is part of the career progression of the Navy HR Officer. A graduate education is important for promotion and screening for milestone billets throughout the Navy, and in the 1200 community. According to the HR Community Manager and the Head Detailer, extensive knowledge is

needed in the HR Community in the following HR related areas: manpower; operations analysis; education/training; financial management; human performance technology; and human resources support systems. (USN 2005b) The value of a postgraduate education for the HR community is proven by examining the 2005 promotion and Major Command board results. All of the Captains (O-6) selected for Major Command, and 90 percent of those selected for Commander (O-5) had a master's degree. Of those selected for Lieutenant Commander (O-4), only 55 percent had a master's but most others had made significant progress towards an "HR/Management"-related master's. (USN 2005b) The career progression of the HR Officer typically allows for earning a master's degree as a Lieutenant (O-3) or as a junior O-4. This career progression chart can be seen in Figure 1 below. A majority of the 1200 community is accessed through lateral transfers from Unrestricted Line communities, so there is limited opportunity for an officer to have a degree prior to the O-4 board, accounting for the lower number for O-4s with a graduate degree.

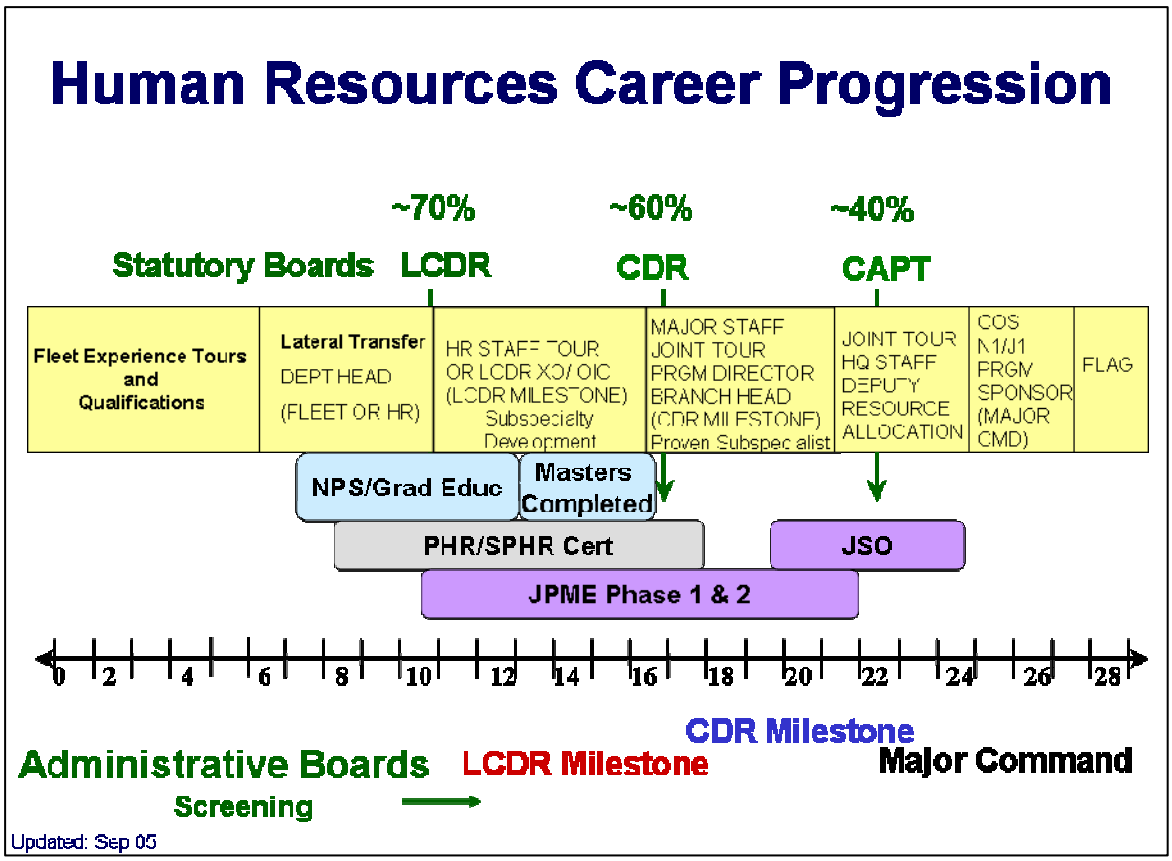

Figure 1: Navy HR Officer Career Progression (From: USN 2005b).

2. The Naval Postgraduate School and the MSA Curriculum

One of the Navy's main graduate education programs for HR officers is offered through the Naval Postgraduate School (NPS). Over forty different master's degrees are available at NPS in the schools of Business and Public Policy, Engineering and Applied Sciences, Operational and Information Sciences, and International Graduate Studies. The Manpower Systems Analysis (MSA) Curriculum is offered as part of the School of Business and Public Policy. This curriculum is a 21-month program addressing Manpower, Personnel, Training and Education (MPT&E) issues as they relate to DoD and the Department of the Navy (DoN). Officers enrolled in the MSA curriculum are from various services and countries. However, many of the Naval Officers enrolled are from the Navy's Human Resource Community (officers with a 1200 designator). With the Navy's recent discussions on downsizing and

reorganization, expertise in manpower and human resource-related issues is highly desired. Chief of Naval Operations (CNO), Admiral Mike Mullen, stated one of his top priorities for 2006 is to "Develop 21st Century leaders." One of his desired effects is to have "A transformed manpower and personnel system [which] delivers an improved quality of service that is more responsive to the men and women serving the Navy." (Mullen, 2006, pp.3-4) In order to develop these "21st Century" leaders who can transform the manpower and personnel system, education is necessary and the MSA curriculum's current relevance has grown.

A Naval graduate from the MSA curriculum is assigned the 3130P (Manpower Systems Analysis)-subspecialty code. The P indicates the person received graduate education in the subject. The NPS MSA curriculum is the only source for an officer to obtain the 3130-subspecialty. All Marine Corps MSA graduates receive the 9640-Military Occupational Specialty (MOS), Manpower Management Officer. Although non-DoD students attend the curriculum, this study looks at only Navy students in the MSA Curriculum.

3. Other Military and Civilian Institutions

In addition to the Naval Postgraduate School, Navy funded Military Graduate Education programs are offered at the Air Force Institute of Technology (AFIT), National Defense University, the Defense Intelligence College (DIC), the Air Command and Staff College, and the Naval War College. There are also special graduate programs offered at several civilian institutions including the Massachusetts Institute of Technology (MIT), Harvard, and Duke. The civilian universities that are approved by the Chief of Naval Operations vary by course of study.

There is no civilian or military university that offers a master's that can duplicate the MSA curriculum. There is an Education and Training master's that is offered at six different universities across the country. However none of these curricula result in the same Navy subspecialty code as the MSA curriculum.[2]

[2] As outlined in OPNAV Notice 1520 (Oct 1996), the six universities that offer the Education and Training masters are George Mason University, University of Memphis, Old Dominion University, San Diego State University, University of Rhode Island, University of West Florida.

(USN 1996) The only way to receive the 3130X-subspecialty code is by completing the MSA curriculum at the Naval Postgraduate School. The Education and Training master's degree offered at the civilian universities also does not address the topic from the same military aspect as the education given at the military facilities. An HR-related master's is preferred in promotion and milestone selection boards for the Navy's HR community. In addition to the Education and Training Masters, HR officers can also work towards masters' degrees in the following HR related areas: business administration; economics/finance; educational technology; human resource management; human systems engineering; operations management; organizational management; and organizational development. The value of the military-specific education has not been established but is one factor to consider when the Navy is selecting an education source for officers.

C. BILLETING PROCESS

According to both the DoD Directive and the OPNAV Instruction on Graduate Education, an officer who receives a fully or partially funded graduate degree must conduct a "payback tour" following the education. The eligibility of a payback tour is considered a "validated position" that requires the subspecialty received. The payback must be completed within two tours following the education; however, a quick payback is preferred. (DoD 2004, p.3 and USN 1991b, p.2) For Navy personnel, any exceptions to the payback requirement must be approved by the Chief of Naval Personnel.

1. Navy Billeting Process

Since the policy on utilization of graduate education is so strict, it is surprising that the Navy's billet process is not more stream-lined. With only a few exceptions, the Navy's officer billeting process is conducted on a by-tour basis. This means the person is only detailed to his or her next command, with no discussion of follow-on billets. This can prove to be especially difficult once a subspecialty is acquired. With the Navy's policy on subspecialty utilization, using the MSA curriculum as an example, the graduate should ideally be detailed to a 3130P-coded billet. This follow-on billet, requiring the MSA graduate degree

would serve as the “payback tour,” earning the graduate the 3130Q-subspecialty upon completion. The “Q” indicates that the person not only received graduate education in the subject, but is also a “proven subspecialist” with professional experience in the field. An officer with significant on-the-job experience and the MSA master’s would receive a 3130R-subspecialty code. (USN 2005a) Although, ensuring each member completes his or her payback tour is not as difficult in the HR community as it is in the Unrestricted Line Community, it is still an additional billeting consideration.

2. Marine Corps Special Education program

The Marine Corps detailing process following graduate education is different from the Navy’s. Instead of finding billets for the graduate after graduation (or close to graduation), the Marine Corps has a program established specifically to track and manage graduate education and education utilization. The purpose of this program, entitled the Special Education Program (SEP), is to coordinate several hundred billets requiring postgraduate education with graduate education curricula and officer placement in those curricula. (USMC 2003). The program validates the graduate education billets and most students know where they will be going for their 36-month payback tour when they start their graduate programs. Most of the funded postgraduate education in the Marine Corps is managed by the SEP.

D. NEED FOR SURVEY

Throughout the corporate world, companies are trying to determine how to measure human capital. Human capital development can occur through on-the-job experience, formal education, or company-specific training. The value in on-the-job training and company-specific training can usually be easily seen if the organization decides to measure it. What is not as straightforward is the economic return an organization gets from funding formal education that is transferable to other companies. Is the amount of return to the company worth sending an employee to receive higher education? How can the organization measure the worth of a person with and without graduate education?

The Navy is just like any other company; it too, needs to determine if the investment in education has a sufficient economic return. Whether the return is in the form of increased productivity or efficiency of the graduate, or merely an increase in retention, the magnitude of the return needs to be measured. When it comes to NPS specifically, the Resource Sponsors need to know if each curriculum offers what is necessary to prepare officers for their payback tours. It is important to determine if an education at NPS, in this case the MSA curriculum, generates value to the Navy. The goal of this thesis is to develop two surveys that can be used to measure the perceived value of the MSA curriculum to corporate Navy.

As per the requirements established by the Navy Instruction, OPNAVINST 5450.210B, the curriculum is reviewed biannually and changes are made to keep the curriculum current to the needs of the Navy. Changes in the past have included changing the MSA degree for most Navy students to a Master's in Business Administration (MBA) instead of a Master's in Science (MS). In the most recent curriculum review, however, the sponsor requested the degree revert to an MS. In addition, the curriculum review is conducted to ensure that the MSA curriculum maintains its relevance and is effective in preparing Navy graduates for 3130-subspecialty billets.

1. Sponsor of MSA Curriculum

A Resource Sponsor is responsible for the program's content and execution, and ultimately defending the program in the budget process. The Navy defines a resource sponsor as the following:

> The OPO [OPNAV Principle Official] responsible for an identifiable aggregation of resources which constitute inputs to warfare and supporting tasks. The span of responsibility includes interrelated programs or parts of programs in several mission areas. (USN 1998, Appendix B)

The Navy Human Resource community's resource sponsor is the Manpower and Personnel organization (N1). The mission of the N1 organization is to "support the needs of the Navy by providing the Fleet with the right person in

the right place at the right time." (USN 2006) A subset of the Manpower and Personnel Organization, the Strategic Planning and Analysis Directorate (N14), is the resource sponsor for the MSA curriculum. As the resource sponsor, N14 is directly interested in maintaining the validity of the MSA curriculum and adapting the courses to meet the changing needs of the Navy. As a parent organization of N14, N1 is ultimately also a key shareholder in the review process. As per Navy instruction, N1 is required to review and validate each subspecialty every two years. (USN 1998, p.8-1) As a result, NPS is also required to conduct subspecialty curriculum reviews biennially, submitting written reports via the N14 organization to the CNO. (USN 1991)

2. Current Curriculum Review Process

The review process consists of key curriculum advisors discussing possible changes, directives from the administration (in the School of Business and NPS-wide policies), and any requested changes from the resource sponsor. In addition, the Marine Corps outlines specific requirements for Marine Corps students in the MSA curriculum. Currently, the only student and graduate feedback that is used in the curriculum review process consists of Student Opinion Forms (SOFs) and exit surveys of graduates. Besides the exit surveys conducted, no feedback loop exists to capture lessons learned from graduates in follow-on MPT&E billets or from their supervisors.

3. Goal of Survey

This thesis proposes that an external feedback loop will be created using a survey given to both graduates and their immediate supervisors. The surveys are a vehicle to measure the perceived value of the curriculum. For the purposes of this study, a protocol analysis was conducted to pilot test the survey. The final product of this thesis is a smooth copy of the two surveys. The surveys can then be used by the resource sponsors or in a follow-on study to capture the value of the MSA curriculum to the Navy and the individual. This retrospective look could prove very useful in revising the curriculum and meeting changing needs of the Navy.

The graduate survey will focus primarily on two of the four levels of Kirkpatrick's training program evaluation: reaction and learning. (Kirkpatrick 1998) Graduates are asked questions about how the curriculum changed them, either through learned skills or attitudinal changes.

When management discusses the effectiveness of training programs, they usually use Kirkpatrick's behavioral or results perspectives. The survey for the supervisors will primarily focus on behavioral criteria because evaluation of the economic Return on Investment (ROI) metric, which involves estimating economic costs and benefits, is outside the scope of this study. Supervisors are asked questions to determine how prepared the MSA graduates are compared to other graduates and whether the MSA graduates meet their expectations. Questions were designed to measure differences in performance between graduates and non-MSA graduates.

E. RESEARCH QUESTIONS

The direct research questions that will be addressed in the scope of this thesis are: (1) what kinds of metrics have been, or could be, used for evaluating training and education?; and (2) what are the aspects of the MSA curriculum that should be assessed in a survey to determine the value to the Navy of the MSA curriculum?

F. ORGANIZATION OF THE THESIS

This thesis is organized into four chapters. Chapter II briefly reviews methods for measuring the return on human capital investments, training evaluation models, and discusses prior studies on graduate education. This chapter also discusses traditional Return on Investment cost analysis of training, Knowledge Value Added, and survey writing techniques. Chapter III describes in detail the Manpower Systems Analysis curriculum, the target population, and the measurement tools that are created--the two surveys or final output of the thesis research. This chapter also discusses the methods for evaluating the surveys. Chapter IV summarizes the results of the research and makes recommendations for future studies.

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II. LITERATURE REVIEW

A. MEASURING THE RETURN ON HUMAN CAPITAL INVESTMENTS

Many different approaches have been used to measure investments in human capital. However, "there are no generally accepted accounting procedures for valuation of human assets—employees." (Carnevale and Schulz 1990, P.230) Some organizations have attempted an employee valuation, distributing costs of recruitment and training across the expected length of employment. Other organizations use replacement costs of an employee. Yet another way to evaluate human capital investments is to estimate the monetary value of changes in employee behavior due to training. (Carnevale and Schulz 1990, pp.230-231) This chapter demonstrates some of the different models that can be used to evaluate training and education and discusses different methods of measuring the return on human capital investments. In addition, some Department of Defense and corporate examples of training and education evaluations are included.

1. Training Evaluation Models

a. Kirkpatrick's Four Levels of Evaluation

It is not enough to simply conduct training in an organization, but that program must also be evaluated to determine its effectiveness. (Kirkpatrick 1998b, p.1) Donald L. Kirkpatrick identifies three reasons for why we should evaluate training: "to justify the existence of the training department…to decide whether to continue or discontinue training programs and to gain information on how to improve future training programs." (Kirkpatrick 1998b, p.16) In order to conduct this evaluation, Kirkpatrick establishes four levels training programs should be evaluated on: reaction, learning, behavior, and results.

The level-one evaluation, the reaction stage, measures how the trainees feel about a program; this is a "measure of customer satisfaction." (Kirkpatrick 1998b, p.19) This evaluation is often conducted using questionnaires given to trainees after the training is complete. Many evaluators call these questionnaires, "happiness sheets" or "smile sheets." (Kirkpatrick

1998b, pp.25, 28) Often people view these surveys as worthless; however, they do provide valuable information. Many times, positive feedback is all that is required to continue a program. Kirkpatrick also states that if trainees do not react “favorably” to a training program, they usually are not motivated to learn. Kirkpatrick states four reasons why it is important to measure reactions: (1) the feedback can be used to evaluate the current program and improve future programs; (2) involves trainees in improving the program, tells them that their feedback is important; (3) gives quantitative data; and (4) results can be used to establish performance standards for future training. (Kirkpatrick 1998b, p.25) To understand trainees’ reactions, Kirkpatrick suggests using open-ended questions in addition to questions that can be tabulated. Without these open-ended questions, it is difficult to understand reasons for the reactions and to identify areas for program improvement.

After measuring reactions to the training programs, Kirkpatrick says that “learning” must be evaluated. This level measures the “extent to which participants change attitudes, improve knowledge, and/or increase skill as a result of attending the program.” (Kirkpatrick 1998b, p.20) This step is vital because if learning does not take place, behavior cannot change and no results to the company can be realized. Kirkpatrick recommends using a before-and-after training measure of job performance to quantify changes in knowledge, skills, attitudes, and behavior after training.

Although this is ideal, it is not entirely feasible in the Navy in regards to the MSA curriculum. The way the Navy’s billet system works, a person would not return to the same job after completion of graduate education. Therefore, a before-and-after performance measurement on the part of the supervisor would not be possible. Even if FITREPS were used as a measurement tool, they would not accurately portray changed behavior. The Navy’s evaluation system is based on the opinions of supervisors, which vary from person to person. Because the supervisors do not stay the same, the FITREP would not work as a before-and-after form of evaluation. Where before-

and-after measurement will be utilized is through self-evaluations. Each graduate will be asked to rate his or her own behavior changes as a result of the MSA curriculum. The graduate will be asked to assess how specific behaviors changed compared to that prior to entering graduate education.

When measuring learning, it is recommended to use a control group if it is feasible. The control group is a group who did not receive the training but with similar characteristics as the group that did receive the training. A comparison is then conducted between the behavior of those trained (the experimental group) with the untrained group. (Kirkpatrick 1971, p. 96) This control group is used as a comparison in an attempt to eliminate other contributing factors when measuring change. This can be done a bit more easily in the Navy than conducting a before-and-after evaluation. In the survey given to the graduates supervisors, there are a series of questions asking them to compare their graduates to other non-graduate subordinates. In essence, these non-graduates are the control group (not receiving the training) and the graduates are the experimental group.

After “learning” has been measured, an evaluator can determine if the training resulted in any behavior changes. Although Kirkpatrick does suggest that the evaluation levels be conducted in order, Kirkpatrick states that conducting one level of evaluation does not eliminate the need for another. For example, many people believe that if they conduct a level-three evaluation, they need not conduct a level-two, or learning evaluation. Kirkpatrick strongly recommends against this. He argues that there are several cases where learning has taken place but behavior does not change. If learning were not measured then the evaluator would assume that the training was not effective. Behavior changes might not occur if: (1) the person does not want to change; (2) the person does not know what or how to change; (3) the corporate climate is not conducive to change; or (4) the person is given no reward for change (either intrinsic or extrinsic). (Kirkpatrick 1998b, pp.21, 37) In order to evaluate behavior, Kirkpatrick again suggests using a control group and testing before and

after the training. He also suggests that in addition to questioning trainees, evaluators could survey immediate supervisors, subordinates, and others who might observe changes in behavior. Although many people believe a trainee's supervisor would be the best to evaluate a trainee's behavior changes, in some cases, Kirkpatrick states that, "the immediate supervisor may be the person least qualified to evaluate the trainee." (Kirkpatrick 1998b, p.51) This train of thought coincides with the new performance evaluation trend of 360-degree evaluations, where a person's performance is measured by everyone who comes in contact with that individual (supervisors, peers, subordinates, customers). When evaluating this change, it is also important to give time for the training to take effect. It depends on the type of training that is given as to when the trainees should be evaluated for behavioral changes. For example, he states that for some training, a good "rule of thumb" for evaluation is after two or three months and for others, after six months is more practical. Kirkpatrick also suggests repeating the evaluation at different time intervals.

> Some trainees may change their behavior as soon as they return to their job. Others wait six months or a year or never change. And those who change immediately may revert to the old behavior after trying out the new behavior for a period of time. Therefore, it is important to repeat the evaluation at an appropriate time. (Kirkpatrick 1998b, p.55)

In order to measure this desired change in behavior, Kirkpatrick suggests using surveys or interviews, or a combination of the two. He identifies change in behavior as "a means to an end." (Kirkpatrick 1998b, p.56) The "end" is the desired changes in an organization, which can only be achieved through changed behavior.

These coveted changes in an organization are typically the reason for the training in the first place. This final level of evaluation, the results stage, is often the most difficult, but most requested evaluation. Top management often requests the results of a training program based on balance sheet figures. Sometimes results of training programs can be easily measured such as

increased production, sales or profits; and reduced turnover, costs or failure rates. Kirkpatrick also notes that often results can only be seen on a long-term basis such as improved morale or quality of work life. Although it is difficult to quantify these improvements, it is implied that these changes will cause the desired tangible results in the future. There are a series of guidelines that are established when evaluating results. These guidelines are similar to those for evaluating change. It is recommended to use a control group and measure both before and after the training is conducted. Also, as with the behavior level, it is important to allow time for the results to occur and to re-measure at different time intervals. Kirkpatrick also warns the evaluator to weigh the cost of evaluation against the benefits. If it is too costly to quantify the results of a program, and the first three levels are sufficient, then the benefit of conducting an evaluation of results does not outweigh the costs. If the program is going to be conducted often, then more costly evaluation might be justified. In addition, the evaluator must determine what level of certainty is required. If management would be satisfied with evidence of positive results of the training, then extensive, costly evaluation is not needed. Kirkpatrick further warns that proof is often not feasible and one must settle for evidence of improvement.

b. Martin Marietta's Five Step Model

A common complaint about Kirkpatrick's four-level model is that evaluation is often looked at only from the perspective of how good the training is, not on job performance improvements. According to Marshall and Schriver (1994, p.127) from Martin Marietta, this downfall leads to evaluation based on simply the reaction of the trainees to the training. The lip service that many companies give to conducting training as a requirement, rather than a way to improve on skills that are lacking, leads companies to evaluate training purely in the first two levels, reactions and learning. (Marshall and Schriver 1994, p. 127)

Often evaluators oversimplify Kirkpatrick's model, by evaluating only knowledge based on written test results and failing to measure the trainee's skills gained. Martin Marietta Energy Systems developed a five-step model to

better evaluate both knowledge and skills. This model separates the evaluations into two sections, formative and summative. The first three sections are the formative parts, measuring attitudes or feelings (similar to Kirkpatrick's reaction stage), knowledge and skills (both part of Kirkpatrick's learning stage). The summative part of the model consists of measuring skills transfer, or behavior modification (Kirkpatrick's Behavior stage) and Organizational impact (Kirkpatrick's results stage). (Marshall and Schriver 1994, p. 129) Martin Marietta's Model for Evaluating Knowledge and Skills can be seen below in Figure 2.

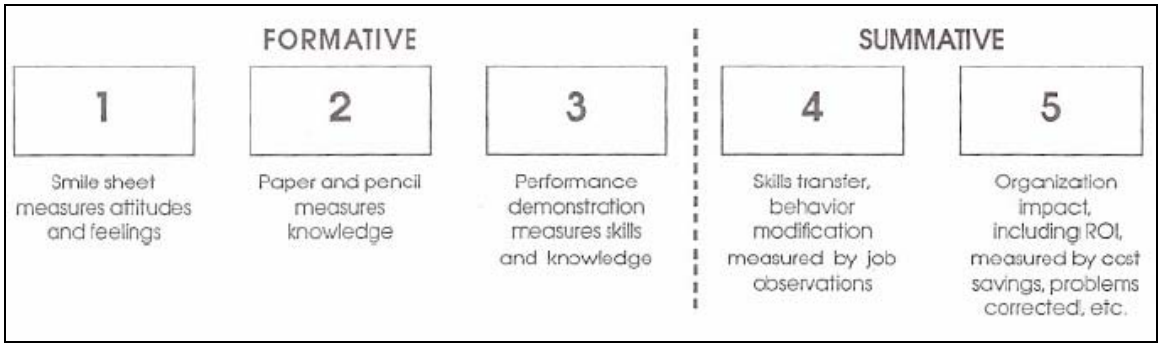


Figure 2: Model for Evaluating Knowledge and Skills (From: Marshall and Schriver 1994).

c. Training Impact Tree

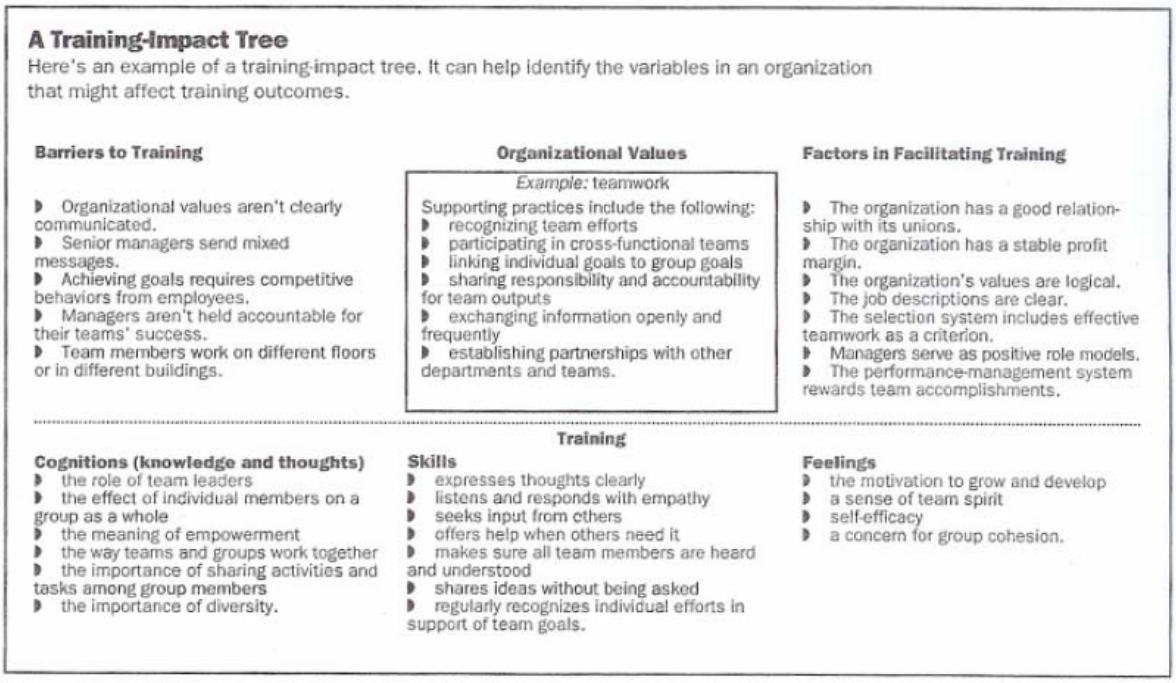
Paul Bernthal, a research consultant from Development Dimensions International, argues that Kirkpatrick's four-level model is too simplistic and has some inherent pitfalls. "…It has also limited our thinking regarding evaluation and possibly hindered our ability to conduct meaningful evaluations." (Bernthal 1995, p.50) Bernthal (1995) points out that there are a series of false assumptions about four-level evaluations. Many people believe that evaluations are conclusive and reliable; however, he says often the results could not be duplicated. The second assumption is that "evaluation equals effectiveness." (Bernthal 1995, pp.50) He states that although the two are associated, they are not that easy to measure. To fully capture the effectiveness of a training program, the evaluator must look at different organizational,

individual and training-related factors. Another big assumption companies often make is that the trainers are accountable for effectiveness of the training. Bernthal (1995) states that trainers often do not possess the skills, time and resources necessary for thorough evaluations, yet are still held responsible. Possibly the biggest argument Bernthal has against Kirkpatrick's four-level model is based on how many people interpret the model. Often, Kirkpatrick's fourth level is described as the highest or best type of evaluation. Bernthal argues that each level has equal value in different situations.

Bernthal suggests a series of additions to the four-level evaluation model. He states that the evaluator needs to understand where the training fits in the organization, determine the cause-and-effect between training and outcomes, and choose appropriate evaluation designs and measurements for different steps in the evaluation process. Also, the evaluator must remain realistic about the time and resources that can be allotted to evaluation and should create an evaluation program for long-range use. (Bernthal 1995, pp.52-53) Bernthal lists a series of seven steps to use in conjunction with Kirkpatrick's four-level model: (1) Identify the organizations' values and practices; (2) Identify the desired knowledge, skills, and attitudes; (3) Determine the purpose and scope of the evaluation; (4) Identify the data sources; (5) Select the best method for data collection, taking into account how often the evaluation will occur and how many people will be evaluated; (6) Choose the best measurement approach; and (7) Gather and Inventory your resources. (Bernthal 1995, pp.52-53)

To improve on some of the pitfalls Bernthal finds with Kirkpatrick's four-level model, he recommends several areas that should also be evaluated: "the quality, delivery, or retention of the training; how well the training cut deficiencies in a particular work group; the usefulness of parallel training for managers and their staffs; and variables in the work environment that discourage or facilitate the effect of training." (Bernthal 1995, p. 52). He suggests using a "training-impact tree" to look at some of these factors when developing the long-range plan. The tree is a planning tool used to identify any factors that could

affect training and evaluation within an organization. The Training Impact tree is essentially identifying the organization's values, barriers to training, and factors that will aide in training. The final portion of the Training-Impact Tree is listing the knowledge, skills and attitudes the training is designed to teach. An example of the Training-Impact Tee can be seen below in Figure 3.



A Training-Impact Tree

Here's an example of a training-impact tree. It can help identify the variables in an organization that might affect training outcomes.

Barriers to Training

- Organizational values aren't clearly communicated.
- Senior managers send mixed messages.
- Achieving goals requires competitive behaviors from employees.
- Managers aren't held accountable for their teams' success.
- Team members work on different floors or in different buildings.

Organizational Values

Example: teamwork

Supporting practices include the following:

- recognizing team efforts
- participating in cross-functional teams
- linking individual goals to group goals
- sharing responsibility and accountability for team outputs
- exchanging information openly and frequently
- establishing partnerships with other departments and teams.

Factors in Facilitating Training

- The organization has a good relationship with its unions.
- The organization has a stable profit margin.
- The organization's values are logical.
- The job descriptions are clear.
- The selection system includes effective teamwork as a criterion.
- Managers serve as positive role models.
- The performance-management system rewards team accomplishments.

Training

Cognitions (knowledge and thoughts)

- the role of team leaders
- the effect of individual members on a group as a whole
- the meaning of empowerment
- the way teams and groups work together
- the importance of sharing activities and tasks among group members
- the importance of diversity.

Skills

- expresses thoughts clearly
- listens and responds with empathy
- seeks input from others
- offers help when others need it
- makes sure all team members are heard and understood
- shares ideas without being asked
- regularly recognizes individual efforts in support of team goals.

Feelings

- the motivation to grow and develop
- a sense of team spirit
- self-efficacy
- a concern for group cohesion.

Figure 3: Training Impact Tree (From: Bernthal 1995)

d. Input, Process Output

Increasingly, organizations are moving away from using only the standard four-level model proposed by Kirkpatrick. According to David Bushnell (1990), a director at the Human Resources Research Organization, many industry leaders are now developing an input-process-output (IPO) method for evaluating training. This model is used to see if training programs are achieving their intended purposes and as a way to determine whether students acquire the needed skills and knowledge. The IPO Evaluation Model is based on the idea that every training program has an input, a process and an output and should be evaluated at each of these points. (Bushnell 1990, p.40) Bushnell describes the factors that could contribute to the training effectiveness as the input factors, or

the system performance indicators. These factors include trainee qualifications, instructor abilities, the quality of instructional materials, availability of training facilities and money. In the process stage, the planning and implementation of the training takes place. The output evaluation stage captures the "short term benefits of the training." (Bushnell 1990, p.40) This stage includes trainee reactions and the harder to measure knowledge and skills gained and improved job performance. The outcomes of training are generally longer term, including company profits, customer satisfaction, and productivity. Bushnell states that feedback loops must exist through the training process at each critical stage in order to make the training system "somewhat self-correcting." (Bushnell 1990, p. 40) The IPO model Bushnell introduces can be seen in Figure 4, below.

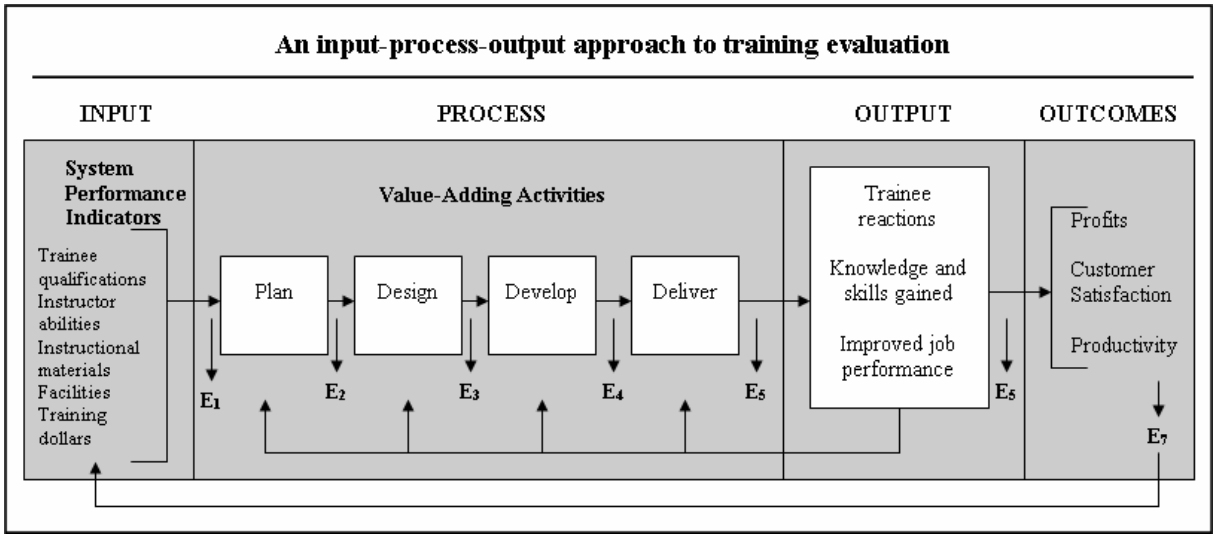


Figure 4: IPO Training Approach (From: Bushnell 1990, p.40)

2. Return on Investment Cost Analysis of Training

Many managers want a more exact measurement of value of training and education. This frame of mind is displayed in the words of one Fortune 100 financial Vice President to his Director of Human Resource Development. "I invest in training the way I invest in a machine tool. If you can't show me an ROI equal to this firm's cost of capital, I'm not buying—and your budget is going to be cut." (Spencer 1986 p.1) Measuring the return on investment for training is a way to show the value of an organization's training directly as it relates to the

company's bottom line. There are four reasons for cost-benefit evaluation: improve practice; survival; credibility; professional development; and satisfaction. (Spencer 1986, p.2) When cost benefit analysis is conducted, human resource personnel and activities productivity can increase by 30 to 50 percent. (Spencer 1986, p.2) Even though there are such positive reasons for conducting return on investment cost benefit analysis, these studies are not often done…"most people believe these data are hard, expensive, and take a long time to get." While it is true that these computations are often more time consuming, they can be a great value to the organization, "more valuable measures may require more resources: you get what you pay for." (Spencer 1986, p.18)

Jack Phillips also discusses a "Chain of effect" when it comes to evaluating training. He uses a Five-Level model adapted from Kirkpatrick's four-level model. The additional element includes the ROI evaluation step as the fifth level. (Phillips 1996b) This model can be seen in Figure 5 below.

Here's a slightly modified version of Kirkpatrick's four-level evaluation model, adapted to include measuring for return on investment.

Level	Questions
1. reaction and planned action	What are participants' reactions to the training? What do they plan to do with the material?
2. learning	What skills, knowledge, or attitudes have changed? By how much?
3. on-the-job application	Did participants apply on the job what they learned in training?
4. business results	Did the on-the-job applications produce measurable results?
5. return on investment	Did the monetary value of the results exceed the cost of training?

Figure 5: Five-Level ROI Evaluation (From: Phillips 1996)

It is difficult to measure the effect of training on performance because often other variables also contribute to changes in results. The best way to

account for other variables is to use a control group of people who did not receive the training. If this cannot be done, another option is to have the participants in the training estimate how much of their improvement is due to the training they received. The subjects should also be asked what their estimation is based on and how certain they are in the estimation. (Phillips 1996b, p.217-218)

To determine the Return on Investment, the costs of a training program are subtracted from the monetary benefits of the program, which yields the net benefits of the training. The net benefits are then divided by the costs. (Phillips 1996, p.210) There are five steps to calculating the return on investment of a program. First, the level four results should be determined. Then, the evaluator needs to try to isolate the factors that contributed to the training from other external factors that might have affected the results. This is most easily done if a control group is used. The evaluator then needs to try to measure the results as related to monetary benefits to the company. The evaluator needs to then determine the cost of the training, including lost opportunity costs of the trainees and trainers. The final step of calculating ROI is to compare the costs of the training with the benefits of the program. (Phillips 1996, p.220c) A framework for developing an ROI model can be seen in Figure 6.

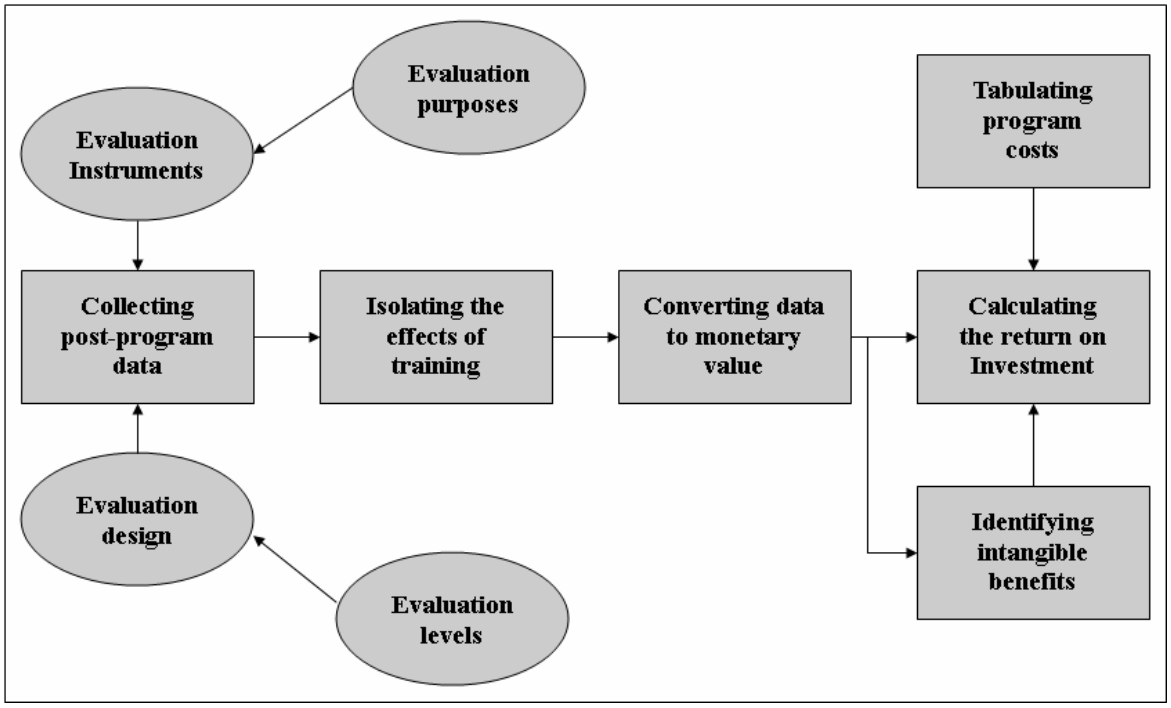


Figure 6: A Model for Calculating ROI (From: Phillips 1996)

Phillips describes the results that are measured to determine ROI as hard and soft data. Hard data are usually easier to measure in an organization. These include standard measures of performance in an organization such as: increased production output; reduced material waste or rework; money saved; and increased sales. These factors are usually easily converted to bottom line financials and are objective. Soft data on the other hand are less easy to measure and difficult to quantify. Soft data often has to do with employee behavior and attitudes such as employee absenteeism or tardiness and job satisfaction. Management often puts little credibility in using soft data as a performance measure. (Phillips 1996, p 20)

3. Knowledge Value Added (KVA)

Return on Investment calculations are essential in a production company but when the asset to an organization is intangible, measurement proves to be more difficult. Knowledge is a fundamental asset of the Information Age as we move from a nation of production to service. (Housel and Bell 2001, p.40) With this transformation, knowledge measurement is essential. Housel and Bell

describe knowledge as a “fundamental unit of measurement,” which needs to be tracked through each operation. Knowledge value added (KVA) is an approach designed to estimate the value of knowledge in an organization. The KVA approach is conducted using ratio of the knowledge needed for a required output in an organization. Housel and Bell describe the KVA ratio as follows:

> This is accomplished through a return ratio with the numerator of the ratio being the percentage of the revenue or sales dollar allocated to the amount of knowledge required to obtain the outputs of a given process in proportion to the total amount of knowledge required to generate the corporation’s salable outputs. The denominator of the ratio is the cost to execute the process knowledge. (Housel and Bell 2001, p.40)

Subject-matter experts within the organization are interviewed and all processes within the organization are observed. It is determined how much time is spent learning each process, the monetary value each process adds, and the cost spent teaching the process and how long the process takes. Including all these computations allows for knowledge to be measured. KVA provides a standard output in terms of units of knowledge for each process. A great advantage of KVA is that knowledge is expressed in a common unit across all jobs and processes.

4. Economic Value Added (EVA)

Author, and president of Imperial Corporate Training and Development, Edward Gordon (1996) discusses that there are several ways to measure value of educational programs, a way to measure how much a training program is worth, calling it economic value added (EVA). One type of EVA Gordon mentions is “*Utility analysis.”* (Gordon 1996, p.69) He describes utility analysis as “a hard-data method for determining return on investment (ROI) for training by calculating the value of an intervention (i.e., a training program) minus its costs.” This economic gain, or the added value, is computed by taking the outcome of the training, multiplied by the dollar value of the training effect. Gordon’s equations can be used to conduct a cost-benefit analysis of the training program.

This computation can be seen in the utility analysis equation below. (Gordon 1996, p.69)[3]

$$F = N[(E * M) - C]$$

F = financial utility
C = cost of the training per person
N = number of people trained
M = montetary value of the training effect
E = effect of the training on the business

Another form of economic value added is the *Performance value*. This method attempts to quantify the monetary value of problems that are to be addressed by the training.[4] Total Quality Management (TQM) and Six Sigma approaches are examples of ways performance value is being used. Companies trained employees to improve quality in manufacturing, which, in turn, increased company profits. "Poor quality in products or services may often cost tens of percents of economic value added." (Gordon 1996, p.69)

The value of education to a manufacturing firm can be realized more easily when profits or quantity of production is measurable. One of the biggest challenges facing companies today is when this economic value added cannot be traced directly to a balance sheet or bottom line company profits.

There are several additional computations that will yield the monetary value of human capital. In his book, The ROI of Human Capital, Jac Fitz-enz (2000) identifies a series of equations that can be used in addition to the utility analysis equation above. Fitz-enz (2000, p.32) discusses calculating the "HEVA" or Human Economic Value Added, which is simply the cost of capital subtracted from the net operating profit after taxes divided by the number of full time employees. This can be seen in Equation 1 listed below. Another formula that can be used to measure profitability for the average employee is "HCVA" or

[3] For a more detailed explanation of the utility analysis approach, refer to Wayne F. Cascio's 1989 book, Training and Development in Organizations, and Michael Godkewitsch's 1987 book, Training.

[4] For more information on Performance Value, see Forecasting Financial Benefits of Human Resource Development, written by Richard A. Swanson and Deane B. Gradous (1988).

Human Capital Value Added, which is expenses (not including pay and benefits) subtracted from revenue, all divided by the number of full time employees. (Fitz-enz 2000, p.35) This can be seen below in Equation 2. Fitz-enz (2000, p.36) also suggests using "HCROI" or Human Capital Return on Investment calculations to look at the return on investment in terms of profits for the amount of money spent on employee pay and benefits. This is calculated similarly to HCVA, but the numerator is divided by the amount of pay and benefits. This can be seen below in Equation 3.

$$\text{Equation 1: } HEVA = \frac{\text{Net operating profit after tax - Cost of capital}}{\text{Number of Full time Employees (FTEs)}}$$

$$\text{Equation 2: } HCVA = \frac{\text{Revenue - (Expenses - Pay and Benefits)}}{\text{Number of Full time Employees (FTEs)}}$$

$$\text{Equation 3: } HCROI = \frac{\text{Revenue - (Expenses - Pay and Benefits)}}{\text{Pay and Benefits}}$$

Unfortunately, most of these measurements do not really work for the Military because it is essentially a "Not-for profit" organization. As a result, we must look at other forms of evaluation.

B. TECHNIQUES FOR EVALUATION

There are several data collection tools that can be used that are both qualitative and quantitative. Some quantitative instruments include: performance records and tests; standardized questionnaires and survey instruments; and personnel assessment instruments. Quantitative data is generally objective, relatively easy to measure and assign monetary values, uses a common measure of performance, and is seen as credible to management. (Carnevale and Schulz 1990, p.246) Some common qualitative instruments are interviews, observations, focus groups, and case studies. In general, qualitative data is usually difficult to measure and standardize, based on behavioral factors and is

less accepted by management. Although many circumstances call for quantitative analysis, often qualitative data provides information that cannot be attained in other ways, or serves as a valuable supplement to the quantitative instruments. (Carnevale and Schulz 1990, p.246)

The Senior HR Management Specialist for the Chief Administrative Office of Los Angeles County identifies ten different instruments or tools that can be used to evaluate training. (Marrelli 1993, p. 58) She continues to identify the strengths and weaknesses of each evaluation tool and warns against using just one. "Different instruments highlight different results of the same training program. You might miss some of the results by using only one instrument." (Marrelli 1993, p. 58) The ten instruments she names are: Interviews, Questionnaires, Group Discussions (focus groups), Critical Incident Reports, Work Diaries, Performance Records, Simulations/Role-Plays, Observations, Written Tests, and Performance Tests.

Getting reports from supervisors on the progress of trainees is an ideal way of evaluating training. However, these reports are often seen as too time consuming and often will not be completed. Also, these reports are often seen as subjective, and can change drastically from one supervisor to another. (Garavaglia 1993, p.75) To get a more objective measurement of the training, a survey or questionnaire can be used. Typically supervisors and trainees are questioned but trainees' peers could also be given the survey for further evaluation. This would be one step towards implementing a 360-degree evaluation of the training. "Surveys and questionnaires provide different perspectives from all of the trainees and supervisors, without costing a lot in time or money." (Garavaglia 1993, p.75)

In addition to performance reports and surveys, interviews could be conducted of the trainees and supervisors. These interviews could be face-to-face, via Video-Teleconferencing or over the telephone. The interviews could be conducted in groups or on an individual basis. (Garavaglia 1993, p.75) While interviews might work on a small scale for an organization, it would be infeasible

in the Navy's Human resource community. Although these surveys are intended for all Navy Manpower Systems Analysis graduates and their supervisors, currently, the Navy's Human Resource community is one of the largest communities with MPT related billets. The HR community has over 750 billets spread out in 14 different regions within the U.S. and 10 different regions outside the continental U.S. Even only looking at billets with the 3130-subspecialty, this number is about 60 throughout the world. (HR website, billet locations.) The vast number and geographic dispersion alone make interviews an unrealistic option.

Although it is ideal to have several different evaluation methods, this thesis focuses primarily on the development of two questionnaires. Given this direction, it is important to look at some of the advantages and disadvantages of questionnaires, as outlined by Marrelli (1993). Some of the biggest advantages of surveys or questionnaires are that they are generally easy to interpret (if constructed correctly) and results can be attained faster than many other forms of evaluation. Respondents often answer more honestly due to anonymity of responses. Also, a large, geographically dispersed population can be questioned at little to no cost. These many advantages to using surveys have led them to be a common evaluation instrument; however, several disadvantages need to be considered. While the anonymity of the survey serves as an advantage, it can also be a disadvantage because the quality of the data depends on the subjects' honest answer response. The respondent may also not remember accurately or have a different perception of the situation being evaluated. There is also no way to determine if the reader of the questionnaire understands what each question is asking and if the answer choices (when the survey is multiple choice) accurately portrays the respondents' feelings. One of the biggest disadvantages is the low rate of return for surveys. (Marrelli 1993, p. 60)

C. SURVEY WRITING TECHNIQUES

There are many different books written on survey writing techniques. Unfortunately, all that surveys have in common is that they are structured questionnaires asked either individually or in group interviews. What is needed,

but is non-existent, is a set of standardized professional guidelines for survey development. (Smith 2003, P. 21)

1. Types of Survey Questions

Questionnaires can use a combination of the following different types of questions: multiple choice, multiple answer, ranked questions, open-ended questions, and scaled questions. (Johnson 1993, P.140) Multiple choice questions consist of two or more mutually exclusive answers. Multiple answer questions allow the respondent to select one or more answer, all that may apply. Ranked questions ask the respondent to rank a list of items. These lists are usually in order of preference or frequency of use. An open-ended question is a question with no right answer. The questions are asked without a selection of answers to choose from. The respondent answers the question in his or her own words. Open-ended questions can provide a wealth of information, but it is often hard to tabulate the results. Scaled questions usually measure how strongly a person feels about a subject. There are three types of scales that are commonly used: Semantic-differential scales; Diagrammatic scales; and Likert scales. Semantic-differential scales are based on a bipolar scale (only two answers). An example of a semantic-differential scale would be “agree/disagree.” A diagrammatic scale is a grid or diagram “on which respondents indicate their position with respect to a statement. Words or numbers are usually not included on the grid, with the scale expressed instead by an abstract category or continuum—for instance, with symbols or pictures.” (Johnson 1993, P.140) A Likert scale asks respondents if they agree or disagree with a statement. Likert scales are commonly given values from 1 to 5, with word explanations for the values. One example of a Likert scale would be 1 “very important,” 2 “important,” through to five being “Not at all important.” “The five-point Likert scale probably is the most widely used rating scale.” (Paul and Bracken 1995, p. 150) The surveys developed for this thesis have a combination of multiple choice questions, open ended questions, and scaled questions using a Likert scale.

2. Testing Surveys

As with survey development, there is no agreed upon way to pretest questionnaires and there is very little guidance on the correct way to conduct such tests. (Bolton 1993, P.2) Pretesting is conducted using a small sample of the population, what is also called a pilot study or pilot test. The pilot study is used to determine where problems might exist with question wording. There are several different ways to conduct a pretest; however, the most effective are usually conducted in one-on-one interviews. (Bolton 1993, P.2) The different methods of pilot testing include "concurrent 'think aloud' interviews, paraphrasing, retrospective 'think aloud' interviews, confidence ratings, vignettes, response latency measurements, and sorting tasks." (Bolton 1993, p.2 from Campanelli et al. 1989, Jobe and Mingay 1990, Royston et al. 1986, Royston 1987). Although each of these methods are useful, some are more difficult to conduct than others.

a. Automatic Coding and Observational Monitoring

A study identifying a method for pretesting questionnaires based on the automatic coding of verbal and nonverbal cues was conducted by Ruth Bolton of GTE Laboratories Inc. This research proposed a new method to identify survey questions that are cognitively difficult for the respondent, measuring their reactions to a questionnaire. The researchers used two pilot groups consisting of residential telephone company customers during 1989. For each pilot testing, face-to-face interviews were conducted.

In 1990, taking the results from the 1989 pilot tests, GTE conducted two additional pretests to evaluate two versions of a survey for GTE's business customers. Both pretests were conducted using one-on-one interviews at focus group facilities in either Dallas or Los Angeles. The group consisted of 28 interviews and the second group consisted of 30 interviews. Each of the interviewers received training on how to conduct the interviews. Each respondent was asked to read the question out loud and explain what they thought about the questions.

In both sets of pilot tests, the respondents' reactions (verbal and nonverbal) to the survey were measured using various coding categories. The five verbal categories that were used were: repeat, forget, confidence, can't say, and don't know. The four non-verbal categories that were used were: questions, pauses, broken utterances and unintelligible utterances. (Bolton 1993, P.4-5) Each coding category was then used to evaluate the questions based on the four stages of macroprocesses a person uses to react to an attitude question. These four stages identified by Touraneau are: "comprehension of the question, the retrieval of relevant beliefs and feelings from memory, the weighing of information to form a judgment, and the selection of an appropriate response alternative." (Bolton 1993, p.4 from Tourangeau 1987) The results of both studies were that GTE determined the best indicator of a person's comprehension is the non-verbal cues in the question category and the verbal cues in the repeat category, meaning the person either looked like they had a question or they asked the interviewer to repeat or clarify the question.

Examining the retrieval difficulties of respondents, the interviewers looked for the verbal cues of broken utterances and the nonverbal cues of a pause greater than three seconds. The rationale behind the broken utterance category is that if people change their thought processes in mid-sentence, the question brings two answers to mind and thus might need revising or should be an open-ended question. Bolton found that when evaluating a question at the judgment stage of macroprocesses, an evaluator should look at the verbal cues of confidence, or a lack of confidence in the responses. The nonverbal cue would be an unintelligible utterance such as "um" or "er." To determine if the response to a question causes cognitive dissidence, the verbal cues that would be noticed are in the "can't tell" and "don't know" categories. Although, initially both studies looked at the forget category as a verbal cue for retrieval difficulties, after data analysis, it turned out to be insignificant. (Bolton 1993, pp. 6-7,10-11)

After conducting extensive data analysis on the different coding from the two pilot tests, Bolton determined that the coding categories that had

been established for the four dimensions of cognitive difficulties (comprehension, retrieval, judgment, and response) were all accurate for both sets of pilot tests even though the populations were different (business and residential customers). These results showed that automatic coding schemes can be used successfully for evaluating or pretesting surveys.

This thesis examines the questionnaire in regards to the four stages of macroprocesses introduced by Touraneau and the verbal and some of the non-verbal cues identified in the GTE study. Through the protocol analysis that is conducted, the survey is improved by looking for areas of cognitive dissidence similar to the GTE study.

3. Avoiding Problems

There are many problems evaluators can encounter when developing surveys. The problems that are most common relate to administering the survey, and survey formulation. Researchers must struggle with the following potential problem areas: low response rates; ensuring honest responses; determining adequate sample sizes; timing of surveys and wording pitfalls. (Nowak 1990, Johnson 1993)

a. Low Response Rates

The response rate of a survey is the percentage of the total sample that was given the survey who respond. A “good” response rate is only about 50 percent. (Nowack 1990, P.146) There are many ways to increase survey response rates. If the survey is conducted internally to the company, the evaluator can provide notice ahead of time that a questionnaire will be sent out. Employees can also be rewarded, using either intrinsic or extrinsic rewards, or a combination of the two, to increase response rates. Return of the questionnaires should be made easy for the respondent. If it is an internal survey, drop boxes or internal mail can be used. If the survey is external, prepaid addressed envelopes can be included or the results can be faxed or emailed to the evaluator. The questionnaire should also look professional and should be fairly short. “In

general, as the length of any questionnaire increases, its reliability increases and the compliance rate decreases." (Nowack 1990, pp.147-148)

To further increase the response rate, evaluators can follow up with employees, reminding them of the questionnaire. Feedback is also vital when eliciting responses, especially if the survey is internal to the organization. If surveys are often given but results are never provided, employees will not see the value of the surveys and will not see that their opinion is actually used. (Nowack 1990, pp.147-148)

b. Anonymity and Honest Responses

Often organizations force employees to respond by having them sign the questionnaire. While this does increase response rates, there are other problems that arise. "When a survey is anonymous, it's difficult to get a high return rate. When it is not anonymous, the reliability of answers is questionable because employees are afraid to tell the truth." (Johnson 1993, P.139) This has become less of a problem with technology, enabling people to take a survey anonymously on line; however, respondents often worry that their identity can be determined through the demographic information collected. While asking for demographic information might deter some respondents, it is necessary to have to understanding the data.

When conducting a survey it is important that responses are honest. Unfortunately, there is no way to guarantee honest responses. Kirkpatrick states that although sometimes knowing the identity of a respondent is useful, it is important to refrain from asking participants to sign their forms in order to ensure honest reactions. (Kirkpatrick 1998b, p.34) This is especially true for internal organizational surveys. According to Kirkpatrick, it is often easier for a person attending an outside program to give honest feedback. One way around this is to include a space for the respondent's name on the reaction sheets with the word "optional." With the optional name space, the respondent can make their own decision as to whether to include his or her name. Generally, if people leave positive comments, they are more likely to include their

names, than when leaving negative comments. If a respondent does include their name, they can be quoted if they say something positive. In addition, this allows for the evaluator to contact the person with further questions or clarification. (Kirkpatrick 1998b, p.34)

c. Minimum Sample Sizes

It is not always necessary to survey the entire population; often a sample of the target population is enough. When a population is large, using a segment of the population is much less expensive and often generates results as reliable as surveying the entire population. However, this does not hold true when the population is small. (Paul and Bracken 1995, p. 149) There are several determining factors that must be included in calculating the minimum sample size for a survey. The evaluator must also consider how precise the population estimate is and what confidence level is desired in the results. For example, does management want the results with 90 percent accuracy, 95 percent, or 99 percent accuracy? The smaller this margin of error is, or the greater the confidence desired, the larger the sample size has to be. For a survey to be relevant, the sample must be random and representative of the entire population. (Nowack 1990, P.146) Included below in Figure 7 is a chart of minimum sample sizes for target population totals.

Minimum sample sizes

Table for determining the minimum sample size required to generalize results to apply to an entire population. Level of confidence is 95 percent that the sample proportion will be within plus or minus .05 of the population proportion. Sample size refers to questionnaires returned, not those sent out. Assuming a 50 percent return rate, send out at least twice the minimum sample size.

Population Size	Sample Size
10	10
50	44
100	80
200	132
300	169
400	196
500	217

Figure 7: Minimum Sample Sizes (From: Nowack 1990)

d. Measurement Timing

As Kirkpatrick alludes to, there is no "right" time to evaluate training; the timing depends on the organization, the person, and the training. (Kirkpatrick 1998b, p.50) Trainers and evaluators do not agree on when this "ideal" time is to evaluate the transfer of training. There are arguments for measuring this transfer immediately, or one to 12 months later. "Generally, it's appropriate to measure the initial transfer of training 3-12 months after training, with six months being the most common time frame." (Garavaglia 1993, p. 75) Experts also recommend re-measuring training transfer at intervals following the training to see how much of the material is still retained and used. Some evaluators recommend reevaluation at six-month and yearly intervals. (Garavaglia 1993, p. 75) According to John Newstrom in *Transfer of Training,* "40 percent of skills learned in training are transferred immediately, 25 percent remain after six months, and only 15 percent remain a year later." (Garavaglia 1993, p.76)

e. Wording Pitfalls/Writing Techniques

There are six important principles to follow when developing survey questions: Keep the survey questions aligned with the goals of the survey; keep it short; avoid double-barreling; be clear and concise; avoid leading and biased questions; and ensure item-scale agreement. (Church and Waclawski, 1998 p.77) Most of these are self explanatory, but there are a few concepts that should be explained in more detail. Double-barreling is asking more than one question in the same item. This can pose problems because often it is difficult for the reader to interpret the question and similarly for the evaluator to interpret the answers. Double-barreling often occurs when survey designers attempt to shorten the length of the questionnaires. Another prevalent issue is leading and biased questions. If a question or the answer choices are poorly formed, the question could lead or bias the responder towards a certain response. Finally, ensuring that the scale used matches the type of question asked is very important. (Church and Waclawski 1998, pp.77-83)

When using such scales to assess people's opinions in a positive or negative direction, the evaluator has to determine how many points to include on the scale. Scaled questions can be either even or odd numbered, and usually range from four to nine points. (Paul and Bracken 1995, p. 150) One pitfall with using an odd number of responses is it might lead respondents to select the middle choice, encouraging a neutral response. The odd number scale often causes ambiguity in the results. One study found that if a question gives a neutral option, 20 percent of respondents chose it. (Paul and Bracken 1995, p. 150) "An even number of response options with no neutral midpoint tends to force respondents to take a stand, though people with strong attitudes typically give the same ratings with or without a neutral midpoint." (Paul and Bracken 1995, p. 150) In order to remove this ambiguity and to force an opinion out of the respondents, the neutral or midpoint scale has been removed from both MSA surveys when feasible. As a result, most of the degree scales the author chose had four response options with no neutral midpoint.

D. A HISTORY OF STUDIES ON HUMAN CAPITAL INVESTMENTS

1. Value of Education and Training to the Military

a. Changes in Performance

A thesis by Celik (2002) looked at the relationship between job performance of DoD civilian employees and graduate education. The data included all full-time DoD civilian employees from 1986 to 1999, except National Imagery and Mapping Agency employees and civilian employees outside the 50 states and the District of Columbia. The data was obtained through the Defense Manpower Data Center. The data set was further restricted to personnel who possessed at least a B.A. or B.S. and were part of the General Schedule (GS) or General Management (GM) pay scales. In all, there were 213,482 complete observations in the data set. (Celik 2002, p.29-30) The performance measures used were salary, promotion, retention, and annual performance ratings. The results of the study were that DoD employees with a Master's or Doctorate received higher salaries and higher performance ratings than employees without higher education. However, these people are more likely to be promoted slower than their peers because they start off at higher GS pay grades and there is less room for promotion in their job hierarchy. In addition, Celik (2002, p.64) found that a DoD employees with a Master's or Doctorate is more likely to leave the service earlier due to increased opportunities outside the federal service.

b. Impact on Promotion

Little research has been conducted to tie the effect of graduate education on productivity. (Bowman and Mehay 1999, p.453) Professor Bowman of the US Naval Academy and Professor Mehay of the Naval Postgraduate School tried to do just that in an attempt to determine how job success is affected by graduate education. The study looked at U.S. Navy officers with graduate degrees and their promotion rates to O-4 (Lieutenant Commander). The study examined data on all officers eligible for promotion between the years of 1985 and 1990 from the Navy's Promotion History File. In total, the study included 6,583 line and staff officers. Bowman and Mehay used both promotion and supervisor evaluations as performance measures. The research found that

those who possess a graduate degree have a probability of promotion 10-15 points higher than those without an advanced degree. The probability increases even further to 15-17 points higher for individuals who received their degree through a full-time funded program, such as NPS. (Bowman and Mehay 1999, p. 460) Bowman and Mehay show that there is a relationship between an individual's promotion probability and graduate education. What is not proven is how much the promotion rate is affected by other unobservable attributes. Bowman and Mehay suggest that some of these unobservables might influence who attends or is selected for a master's degree program.

Bowman and Mehay pose the question of whether students are selected based on job performance or are they "sorted" by the firm or leadership? Although these are good questions and the direct effect graduate education on job performance has not been demonstrated conclusively, there is undeniably a relationship between the two.

c. The Value of Graduate Education

A 2002 study by Branstetter measured the value of a curriculum at NPS for Marine Corps Officers. The data he used represented Marine Corps officers with the 9648 Military Occupational Specialty (MOS) received through the Special Education Program (SEP) as far back as 1987. This is the subspecialty that is earned after completing the Information System Technology curriculum at NPS. A population list was obtained from the Marine Corps Manpower Management and Officer Assignments database. The study included a survey distributed to a total of 84 individuals. (Branstetter 2002, pp. 27, 31) A total of 44 officers returned the surveys, for a survey response rate of 52 percent; however, due to incompleteness, the actual response rate was just over 34 percent.

In determining value of the curriculum, Branstetter examined many aspects of value. He looked at whether the curriculum met the requirements set by the Marine Corps and the usefulness of the topics based on responses from graduates. In the survey, respondents were also questioned about the value of their thesis, preparedness for follow-on billets, and to what extent they used

different knowledge and skills that were taught in the curriculum. Respondents were also asked additional questions such as how much they liked a topic, and the value of the "social connection" formed at NPS. (Branstetter 2002, pp. 43-56)

In determining the effect of personal preference on the perceived value of the curriculum, Branstetter hypothesized that the value of education would vary by each person's perspective. "A student's personal preferences may influence both the student's and the organization's assessment of the education value." (Branstetter 2002, p. 52) The study determined that individuals give a higher value to topics that they are interested in. For example, Branstetter (2002, p.53) determined that there was an 89 percent chance that a topic would be given a rating as 'valuable' if they were very interested in the topic.

In determining the value of the peer network formed at NPS, respondents were asked how critical these relationships were to their follow-on billets and how often they use these connections. The study found that the respondents placed a high value on the social relationship formed at NPS, with an average rating of 4.7 on a seven point scale (7 most critical). The respondents reported a 60 percent likelihood of contacting a fellow student on a weekly basis. (Branstetter 2002, p. 56)

Branstetter (2002) uses the Knowledge Value Added (KVA) approach, introduced by Housel and Bell (2001), to further estimate the value of the IST curriculum to the Marine Corps. In this portion of the research, the author conducted telephone interviews for three types of subspecialty-required, follow-on billets. He received a job description and an estimation of the amount of time needed to teach each required skill or knowledge for the job. He asked the survey respondents, to estimate how much time was spent learning a topic. The cost factor is computed using the salary of the person in each job. This is based on the Military's salary pay scale according to rank. Using this information, Branstetter was able to compare which knowledge and skills were

being utilized the most for which jobs and the cost of that knowledge. (Branstetter 2002, p. 62-67)

Bowman and Mehay (2004) conducted an additional study of the return on investment for Navy graduate education. The study examined the differences in career progression between fully funded graduate education, off-duty graduate education, and no graduate education. This 2004 study looked at all Surface Warfare Officers (SWO) from the rank of Lieutenant (O-3) to Captain (O-6). The data included all officer year groups from 1977 to 1989 and included promotion board results from 1981 to 2000. Overall, the sample size was over 33,000. Bowman and Mehay conducted a cost-benefit analysis of the three different graduate education alternatives. The study identified six possible benefits of graduate education to the Navy: increased retention; increased labor productivity; increased unit productivity; faculty and student research output; technology implementation; an increased quality of life, and improved job and overall satisfaction. The cost-benefit analysis conducted looked primarily at retention and on-the-job productivity benefits. To determine the productivity benefits, the researchers used wage differentials in the civilian labor market for individuals with master's degrees. Because only two benefits were discussed in the study, Bowman and Mehay state that the benefits of graduate education are estimated conservatively. The cost-benefit analysis estimated the cost of fully funded graduate education at $66.8 million and off-duty education at $14.5 million (through tuition assistance). Bowman and Mehay found that funded graduate education had a large retention benefit as compared to the 'no graduate degree' alternative. They found the return on investment was 1208 percent on funded education versus no education. However, the ROI of funded versus off-duty education was only 3.8 percent. This means that the study found funded education has a 3.8 percent return on investment, based mostly on retention benefits, as compared to off-duty graduate education. When determining the net benefits of productivity, the researchers again found that fully-funded graduate education had higher net benefits than off-duty education. Using a conservative

rate of return of two percent derived from the civilian labor market, Bowman and Mehay found that Navy funded graduate education has a 6 percent return on investment as compared to off-duty graduate education programs. The conclusion of the study is that there is a positive net benefit of funded graduate education over off duty education. (Bowman and Mehay 2004)

One limitation of the study is that only Surface Warfare Officers were included in the analysis. However, it is expected that these results could be duplicated in the 1200 community (and other RL and staff communities). The selection of graduate education degrees is not as restrictive as in the SWO community. If graduate education was only offered in areas that can be used directly in a community, subspecialty utilization would increase, which would directly increase on-the-job productivity.

A 1997 thesis by Eckardt established a method for determining the marginal cost of a student at NPS. To determine the cost per student, the author used two models. The first model, the "Cost per Curriculum Model" can be used to determine the average cost per student to attend NPS for FY96, but not the marginal costs. The data used in adopting the first model was obtained through the Registrar's Office at NPS, using FY96 reports. (Eckardt 1997, p.26) The models developed allow the user to account for the type of class offered (residence or distance learning and special operations and international courses), class size, number of lecture hours, and number of laboratory hours. The second model is used to determine the marginal cost per student. This model is developed using the FY96 excess capacity at NPS. The model developed by Eckardt is applied to the Financial Management (FM) Curriculum.

Eckardt's research indicates that there is a large variation of costs per students in the different curricula at NPS. Using the first model, Eckardt determined that the average cost per student was $15,391 in FY96. However, this amount varied drastically by curriculum, for the FM curriculum the average

cost per student was $10,884.[5] (Eckardt 1997, p.84) The annualized marginal cost per student decreases as the number of students increases. For example, the marginal cost of adding five more students was $11,947 in FY96. If 25 students were added to enrollment, the annual marginal cost would be only $7,500. (Eckardt 1997, p.85)

The FM curriculum is in the same department as the MSA curriculum, therefore, it can be assumed that some of the costs incurred are the same or at least similar. The most obvious difference between the two curricula is length of the programs. The FM curriculum is an 18-month program, compared to the 21-month MSA curriculum. Like the FM curriculum, the MSA curriculum also starts twice a year therefore three different sections of students are enrolled at any one time. Because of the three additional months, it is likely that the cost per student and the marginal cost of the MSA curriculum is greater than that of the FM curriculum. Although the computations are not specifically for the MSA curriculum, Eckardt's research provides a good baseline.

In a 2005 study conducted for the Provost of the Naval Postgraduate School, CDR Hatch, USN, (Retired), looked at how the MSA curriculum at NPS was aligned with the needs of the Navy. The data set included 297 officers with 3130 subspecialties. There were officers from the Unrestricted Line community, Restricted Line Community and the Staff Corps, ranging in rank from O-2 to O-6. Hatch used the Navy Officer Billet Classifications (NOBC) to describe the skills needed for each billet requiring a 3130 P-or Q-subspecialty. The study identified six manpower-related skills and 17 additional skills that identified as important to 3130 billets. The skills are listed below in Table 1. These skills are essential components of the MSA curriculum in order to meet the needs of the Navy. The curriculum is based on nine MSA Educational skill Requirements (ESR) that are derived from these identified skills. A list of the MSA curriculum ESRs is shown below in Table 2.

[5] This includes the Direct Teaching salary of the faculty with fringe benefits, the military salary, and OPTAR/travel money.

Manpower-Related Skills	
Manpower Authorizations	
Manpower Change Requests	
Manpower Determination	
Manpower End-Strengths	
Manpower Management	
Manpower Requirements	
Additional Skills Required	
Career Motivation and Promotion	Personnel Orientation
Coordinate Joint DoD Agencies	Plans for Personnel Procurement
Data Analysis	Policy Analysis
Education and Training	Promotion Actions
Joint Personnel Plans	Quantitative and Qualitative skills
Liason, supervise, direct	Review Legislation
Management	Staffing Criteria
Manning Documents	Survey Analysis
Naval Personnel Utilization Plans	

Table 1: Essential Skills for 3130-Coded Billets (From: Hatch 2005)

MSA Educational Skill Requirements	
1	Organization and Management
2	Budgeting and Financial Controls
3	Automated Data Analysis
4	Management Fundamentals
5	Advanced Quantitative and Qualitative Analysis
6	MSA -- Fundamental Concepts
7	MSA -- Policy Analysis
8	Joint Military Strategic Planning
9	Evaluation, Innovation and Creativity

Table 2: MSA Educational Skill Requirements (From: Hatch 2005)

d. Utilization of Graduate Education

In a thesis on follow-on utilization of graduate education in the Navy, Brutzman (1994) analyzed two separate data sets, a cross-sectional and a longitudinal one. The cross-sectional study consisted of officers in the 1993 Officer Master File to look at sub-specialty utilization. With this data set, she looked at all the officers together, then separately by gender, then by designator. The data set used included all Navy officers on active duty FY93 from Ensign to Admiral. The study looked at the Unrestricted Line, Restricted Line and all Staff

Corps communities except Medical Corps officers, Dental Corps officers and Judge Advocate General Corps officers due to differences in their education timelines. The percentage representation by community in this data set was 78 percent Unrestricted Line, 11.7 percent Restricted Line, and 10.3 percent Staff Corps officers. In total, 39,745 officers were included in the final data set. (Brutzman 1994, pp.20-21)

In addition, Brutzman (1994) conducted a longitudinal study using a Cohort file of officers commissioned in 1980 to look at utilization and retention. The data used was obtained from the Navy Officer Master File annual records for a total of 12 years, from 1981 through 1993, with the exception of 1983. The same officer communities were included. (Brutzman 1994, pp.26-27)

Brutzman (1994, p.33) determined that only 13 percent of the officer communities analyzed had fully-funded graduate education. When the Navy assigns personnel to billets for subspecialty utilization, usually they are assigned to a billet requiring the exact subspecialty they received; this would be called a "direct fill." If instead the person is detailed to a billet requiring a similar subspecialty (switch must be an approved substitute), then this is called a "related fill." Brutzman (1994, p.26) includes both direct fills and related fills when identifying subspecialty utilization.

In the cross-sectional study, Brutzman found that over 50 percent of the Navy Officers who receive fully-funded graduate education (FFGE) have difficulties fulfilling their subspecialty payback tours. (Brutzman 1994, p.31) However, overall, she determined that the Navy gets a good return on investment for graduate education in regards to subspecialty utilization. In the 1993 inventory, 78.2 percent of the FFGE subspecialists had utilized their subspecialty in a payback tour within the DoD's two tour requirement. (Brutzman 1994, p.39) These seemingly contradictory results can be explained by designator. The URL community has problems meeting DoD's targeted utilization rate but the overall Navy statistics are so high because the RL and Staff Corps communities' utilization is high and raises the overall Navy average.

Compared to the FY93 cross-sectional study, the 1980 cohort data showed much lower utilization rates. The communities had the same results, with the RL community and Staff Corps having much higher utilization rates than the URL community. Brutzman (1994, p.51) attributes some of the discrepancy between data sets to the career progression of the 1980 cohort in 1993. At only 13 years of service, she notes that some members might not have had time to complete their payback tour and the two-tour period would not have expired at the end of the observed period.

Looking at retention rates, Brutzman determined that the retention rate for officers with fully-funded graduate education (FFGE) is higher than their peers without fully-funded education such as NPS. (Brutzman 1994, p.52-53) At the end of the 13-year period of the longitudinal data, 89.2 percent of the FFGE subspecialists were still on active duty, compared to 33.7 percent of other subspecialists (officers who have graduate education but not through a fully-funded graduate education program) and only 25.7 percent of officers who had no graduate education. (Brutzman 1994, p.53) Taking into account the commitment in years of service owed after FFGE, Brutzman determined that the retention rate was still double that of the non-FFGE officers. (Brutzman 1994, p. 53)

2. Value of Education in the Corporate World

Unfortunately, many U.S. companies do not associate training and education directly with monetary benefits. Gordon (1996, p.67) states that unlike the US, during times of economic uncertainty, our foreign competitors increase the amount of training invested in their employees because they see human resource development as their "most important national asset." Gordon argues that companies need to start investing more on their most valuable resource, their people. "By adopting a workforce education policy, any organization can harness a proven economic-value-added concept: Human knowledge equals profit." (Gordon 1996, p. 67) In a 1993 study of 12,000 U.S. businesses,

conducted by the U.S. Department of Labor, it was determined that less than half offered formal job-skills training for their workers. (Gordon 1996, p. 67)

a. Short Supply of Educated Workforce

Because of the lack of training offered by U.S. companies, many high-tech" manufacturers are turning towards other countries for their educated workforce. The labor supply for educated workers is now coming more from China, Korea, Singapore, Ireland and Holland than before. (Gordon 1996, P.68) With the talent shortage, many companies are outsourcing their labor to other countries. "Outsourcing work to other countries is an increasingly popular method of coping with the [labor] shortage." (Fitz-enz 2000, P. xiv) This poses a large problem for the military because outsourcing is not always an option. Although the military does accept some non-citizens in their enlisted ranks, this number is very limited and the enlistees must have a working visa. The military has further tried to outsource using contractors and by civilianizing many jobs. For the most part, however, outsourcing is not a viable option for the services when protection of national security is at stake. As a result, there are only limited jobs that can be outsourced to civilians. Therefore, the military needs to make its own investments in Human Capital.

b. Increased Productivity

A 1995 U.S. Census Bureau survey polled 3000 U.S. businesses with 20 employees or more. The study found that education has the greatest increase in productivity over both an increase in hours worked and an increase in capital stock (buildings, tools and machinery). For non-manufacturing jobs, a 10 percent increase in education leads to an 11 percent increase in productivity. This increase compares to only a 6.3 percent increase in productivity from a 10 percent increase in hours. (Gordon 1996, p.67) This is shown graphically in Figure 8, below.

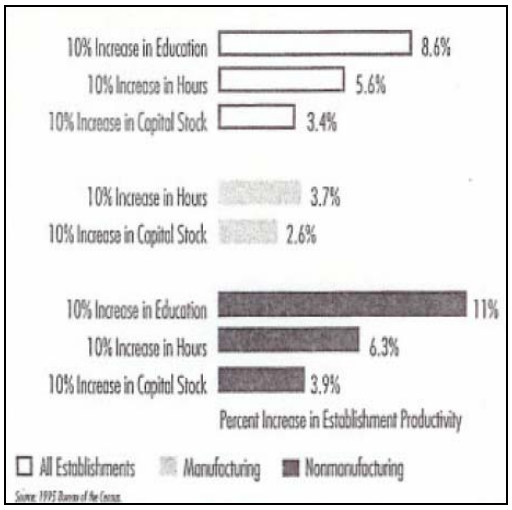


Figure 8: Factors for Increased Productivity (From: Gordon 1996)

E. CHAPTER SUMMERY

Although it is not always easy to capture the return to an organization for graduate education, the need for measurement has been established. Organizations today, especially the military, have to work much harder to quantify the results education and training have on the bottom line. Often the outcome of education and training can be seen in readiness and manning levels as indicators of improved personnel and organizational performance. (Mehay 2005) Several different approaches to evaluating and measuring human capital investments have been presented. Kirkpatrick's four-level model of evaluation and different author's interpretations and adaptations have been introduced. Additional methods for capturing the return to an organization such as Phillips's Return-on-Investment, Knowledge Value Added and Economic Value Added were also reviewed. An explanation of the methods was followed by several examples of how performance, promotion, productivity, and retention are all affected by graduate education both in the Department of Defense and the corporate world. Understanding these methods of evaluation and the examination of previous studies develops a framework for analysis of the value of the MSA curriculum.

III. SURVEY FORMULATION

The literature review identified several methods that can be used for evaluating training and education investments and discussed ways the return on investment can be measured by an organization. This thesis builds on this foundation to develop two surveys that can be used by the Navy to assess the perceived value of the Manpower Systems Analysis (MSA) curriculum. This chapter discusses the objectives and scope of the surveys, explains the instrument that is created, and addresses the process for validating the survey.

A. OBJECTIVES OF SURVEYS

There are three objectives for developing and distributing the two surveys. The principle goal of the research is to develop two survey instruments that can be used to obtain an assessment of the curriculum on a recurring basis. This assessment will be based on the perceptions of graduates and customers of the MSA curriculum. The customer is seen as the Navy commands where MSA graduates work following graduation. These customer's needs are assessed through the Immediate Supervisor Survey. Over time, the surveys will provide a method for determining the difference is between the knowledge, skills and abilities that are taught through the MSA program and what is needed for the manpower billets the graduates fill (the customer needs). Determining what the delta is between what is taught and what is required will allow for curriculum improvement during the biannual curriculum reviews.

A secondary goal of the surveys is to provide another avenue for validating the existing billet structure. The survey responses could provide justification or rationalization for any changes or additions to the 3130 subspecialty requirements of existing billets. A third objective of the surveys is to increase awareness of the curriculum. If the questionnaires are distributed on a regular basis, the curriculum can be kept up to date, while marketing the value of a 3130-coded officer. The revised versions of the Graduate Survey and the Immediate Supervisor Survey are included in Appendix A and B, respectively.

B. SCOPE

The scope of this chapter includes a description of the MSA curriculum and an understanding of the subject populations. The Manpower Systems Analysis Curriculum at the Naval Postgraduate School (NPS) is examined. There are two subject populations for which the surveys are designed: graduates and their supervisors.

1. Manpower Systems Analysis Curriculum

There has already been some description of the curriculum in Chapter I. However, more background is helpful when looking at the survey design. The MSA curriculum has gone through a series of changes over the years. One of the constant changes is the course load. To keep up with the changing needs of the Navy, the curriculum courses are adjusted often. Currently, most of the first three quarters are spent learning basic graduate management topics in the "core classes." These classes teach the concepts of Accounting, Ethics, Finance, Economics, Operations Management, Statistics, Strategy Making and Budgeting and are required for the degree awarded which is the Master's in Business Administration (MBA). After the basics are covered, the MSA students continue on to their MSA-specific classes. There have been several changes in the matrix over the years, but the basic idea of core and MSA-specific classes remains the same.

There are nine Educational Skill Requirements (ESRs) that are taught over the duration of the 21-months of the MSA program. A table of the ESRs is included in Chapter II, Table 2. The ESRs serve as an instructional guideline for each course in the curriculum and help guide which courses should be included in the program. Out of the nine ESRs, there are five that are covered by the core classes and the others are taught mainly through the Manpower-specific classes. The standard MSA class matrix can be seen below in Table 3.

Core ManagementClasses	
GB3010	Managing for Organizational Effectiveness
GB3012	Communication for Managers
GB3013	Problem Analysis & Ethical Dilemmas
GB3020	Fundamentals of Information Technology
GB3040	Research Methods and Data Analysis
GB3042	Operations Management
GB3050	Financial Reporting and Analysis
GB3051	Cost Management
GB3070	Economics and the Global Defense Environment
GB4014	Strategy Making
GB4043	Business Modeling Analysis
GB4052	Managerial Finance
GB4053	Mission, Structure and Resource Determination
GB4071	Economics and Cost Benefit Analysis
GBXXXX	MBA Elective
NW3285	National Security Decision Making
MSA-Specific Classes	
MN2111	Seminar in Manpower, Personnel, and Training Issues I
MN2112	Seminar in Manpower, Personnel, and Training Issues II
MN3111	Personnel Management Processes
MN3760	Manpower Economics I
MN4106	Manpower/Personnel Policy Analysis
MN4110	Multivariate Manpower Data Analysis I
MN4111	Multivariate Manpower Data Analysis II
MN4116	Society of Human Resource Management
MN4119	Navy Manpower Requirements Determination
MN4761	Applied Manpower Analysis
OS4701	Manpower and Personnel Models

Table 3: MSA Matrix (From: NPS 2006)

The MSA-specific ESRs are: Automated Data Analysis; Advanced Quantitative and Qualitative Analysis; Manpower Systems Analysis Fundamental Concepts; and Manpower Systems Analysis Policy Analysis. The Automated Data Analysis ESR requires that students be proficient in data manipulation, statistics, and exploratory data analysis. Additionally, the graduate should have a “thorough understanding of the manpower information systems” and be able to conduct and execute analysis of manpower, personnel and training issues. (NPS 2006) The Quantitative and Qualitative Analysis ESR requires graduates to be able to apply different “organizational, economic, statistical and mathematical techniques and concepts to manpower and personnel policies and issues.” (NPS 2006). This includes econometric and multivariate analysis of large-scale databases and survey data. The MSA Fundamental Concepts ESR requires that

the graduate understand manpower, personnel and training (MPT) concepts within DoD and DoN. The manpower issues a graduate should be familiar with are: billet authorizations and cost; requirements determination; end strength planning; and total force planning and programming. The personnel issues the MSA curriculum is required to cover include: recruiting; officer and enlisted community management; accession plans and policies; attrition and retention; compensation; and readiness. The training areas that a graduate should understand are: theories of learning; instructional technologies; the systems approach to training; training cost and effectiveness evaluation; and training as it relates to fleet readiness. The policy analysis ESR requires that a graduate have the skills necessary to analyze, present alternatives, and understand the impact of manpower, personnel and training policies. (NPS 2006)

The Graduate School of Business and Public Policy (GSBPP) is one of only two institutions across the country that has been accredited by both The Association to Advance Collegiate Schools of Business (AACSB) and The National Association of Schools of Public Affairs and Administration (NASPAA). (NPS 2006b) Because most of the core classes are required for accreditation by these two accreditation organizations, and the goal of the surveys is to receive feedback from the MSA curriculum, not GSBPP, the questions will be centered on the MSA-specific ESRs described above.

2. Subject Populations

a. The Graduates

The intended population for the first survey, included in Appendix A, is the pool of graduates of the MSA curriculum. The survey is designed for all Navy graduates as opposed to just 1200 (HR) officers. Human Resource (1200) officers make up a sizable portion of the students enrolled in the MSA curriculum, although this ratio is decreasing. According to the Strategic Planning and Analysis Directorate (N14), the percentage of 1200 officers to other communities represented in the MSA curriculum will continue to decrease as other communities see the importance of the MSA curriculum and 1200 officers

expand into other curriculums such as Human Systems Integration (HIS) and Operations Research (OR). (W. Wagner, personal communication, May 5, 2006) Because the curriculum is not designed specifically for 1200 officers, the responses from graduates of other communities are also valued. Therefore, the instrument is constructed to elicit responses from all U.S. Navy graduates. At this time, the survey is intended for those who have graduated from the curriculum between 1996 and 2004. This time period restricts the survey to officers who are at least 12-18 months beyond graduation. This restriction allows for the graduate to have some operational experience prior to answering the survey. The insight an experienced graduate offers is much more valuable than someone who just graduated from the program. The experienced officer has had time in to serve in Manpower-related billets, enabling him or her to see what value the curriculum added to their follow-on billets.

b. The Supervisors

The customers of the MSA curriculum are the commands where graduates are working. The best person suited to evaluate the MSA graduate is usually their immediate supervisor. For this reason, the customer survey is designed for the immediate supervisor. The immediate supervisors of MSA graduates in any Manpower, Training and Personnel billets could either be military or civilian. The military supervisor ranks range from Lieutenant (O-3) to Rear Admiral (O-7). The civilian supervisors could hold the position of General Schedule (GS-10 to GS-15) or Senior Executive Service (SES). As of 2005, there were 153 funded billets in the Navy with 3130 P-or Q-coded primary subspecialty. (Hatch 2005) This, however, does not mean that the population is exactly 153 because officers without the 3130-subspecialty might be filling the billet. The survey is intended for the immediate supervisors of the 3130 P-or Q-coded subspecialty officers.

C. SURVEY FOR GRADUATES

This section provides an explanation of the types of questions asked in the survey of graduates of the MSA curriculum. Each question in the survey can be classified into one of four sections: (1) demographic questions; (2) NPS

education-related questions; (3) MSA-specific education questions; and (4) additional comments.

1. Demographic Questions

The demographic questions are required for statistical analysis and are based on both the officer's military and graduate education experiences. Because the curriculum has changed so much over the years, the month and year of graduation are asked. Also, the graduate's designator is requested. This is important because, for example, responses might differ between an Unrestricted Line Officer and a Restricted Line Officer. Also, their previous military experience might affect their responses, such as between a lateral transfer from another community and a direct accession. The graduate are asked if they had a post-baccalaureate degree prior to entering the MSA curriculum. Previous graduate education could affect how a person perceives the value of the curriculum. Each respondent is then asked to list the time spent in Manpower, Personnel, and Training (3130 P-or Q-coded) billets. This information can be used to determine the amount of experience the graduate has in the MPT field. Occasionally, some anomaly in the results can be explained through descriptive statistics. Therefore, to facilitate analysis and understanding of the results, demographic questions are essential.

2. NPS Education-Related Questions

There are many aspects of the NPS educational environment that provide value but are not specific to the MSA curriculum. Each of these aspects needs to be assessed to fully capture the value of the curriculum to the graduate. For example, the officer is asked how he or she selected their thesis topic. The follow-on question is for the respondent to rate how relevant his or her thesis was to their MPT billets and their Navy career. The questionnaire also includes a question to evaluate the value of the unique environment at NPS. Besides the Navy students from different communities, the military student body of NPS consists of Army, Air Force, and Marine Corps Officers. In addition, there are DoD civilian employees and military and civilian foreign students. There are few other opportunities to interact with such a diverse student population. In his

thesis, Branstetter (2002) found that a majority of students stated peer relationships as critical to their success in subsequent follow-on billets. (Branstetter 2002 p.56) Therefore, it is important to capture the effect of peer interactions as a possible source of value in the survey.

3. MSA-Specific Education Questions (ESRs)

There are several questions that are designed to assess the value of the MSA curriculum based on the MSA-specific ESRs described above. These questions relate directly to the MPT topics taught in the curriculum. The respondent is asked to rate the extent to which they were prepared for their follow-on billets via the different MSA-specific areas. When analyzing the results, if there is one area or one specific ESR that many respondents (and their supervisors) feel is lacking, then this is where future improvements could be made in the curriculum.

4. Additional Comments

Although close-ended questions allow for easier interpretation, often comment sections provide greater detail. Allowing the respondent to suggest changes or make any additional comments augments the amount of qualitative information that can be gathered. As discussed in Chapter II, Kirkpatrick suggests using open-ended questions in order to understand the reasons for how a respondent answers a question. (Kirkpatrick 1998b, p.25) The comment questions in the graduate survey serve this purpose and also allow the respondent to share anything else they he or she feels.

D. SURVEY FOR SUPERVISORS

This section provides an explanation of the types of questions asked in the survey of the immediate supervisors of the MSA graduates. Each question in the survey can be classified into one of three sections: (1) demographic questions; (2) MSA-specific education questions; and (3) additional comments.

1. Command Demographic Questions

The demographic questions again are asked in order to provide some background for the survey respondents. There is a possibility that the responses might be reflective of certain characteristics of the population. In order to control

for these variables in the data analysis, it is important to gather some basic demographic information. The background information that is asked pertains to the officer who is answering the survey. The supervisors are asked which officer community they belong to, what their rank is, and if they have the 3130-subspecialty. Each of these questions give some insight into the supervisors' experience and military background. The supervisors are also asked how many and what type of 3130-coded billets they supervise.

3. MSA-Specific Education Questions (ESRs)

This section attempts to determine if there is a difference between MSA graduates and other officers, both with and without a Master's degree. The supervisors are asked questions to determine how steep the learning curve is for the graduates to become proficient in their 3130-coded billets. The supervisors are also asked about the graduates' proficiency level in certain key areas. These key areas correspond with the MPT-related ESRs. The goal of this section of the supervisor survey is to determine if the graduate possesses the MPT skills necessary to succeed in a 3130-coded billet.

4. Additional Comments

Similar to the graduate survey, additional comments are valued for further qualitative information. The supervisors are asked to explain their answers to some questions and are also encouraged to provide any additional feedback about the MSA graduates. This additional section provides the supervisor with an avenue to address anything he or she feels is relevant that was not discussed earlier in the survey.

E. EVALUATING SURVEYS

If an evaluation instrument, such as the surveys developed, is intended for repeated use, it is recommended that some testing prior to distribution is conducted. (Phillips 1997, p.89) As covered in Chapter II, there are many methods for evaluating and validating surveys prior to their distribution. It is important to review the questionnaire for some of the pitfalls discussed in Chapter II. When designing the survey, the questions had to be carefully crafted not to introduce bias or lead the results toward a particular answer. Even after

these aspects are taken into consideration, further testing had to be conducted to ensure the survey would be suitable for the sample audience and would elicit the required information.

1. Protocol Analysis

A protocol analysis was conducted to further test the surveys. The protocol analysis for the Graduate Survey was conducted using both current MSA students and former MSA graduates. The protocol analysis for the Supervisor Survey was conducted using military faculty at NPS who had previously worked in MPT billets, and select military faculty outside of NPS in current MPT supervisory positions. Subjects were asked to read the survey out-loud while the session was recorded. As the participants read the survey questions, they were asked to think out-loud as well and verbalize any hesitations they had. As with the protocol analysis conducted by Bolton (1993), discussed in Chapter II, the reactions of the readers were observed. As the subject read the question out-loud, the observer (the author in this case) looked for evidence of misunderstanding or confusion. This confusion could manifest in the form of hesitation by the reader, re-reading the question, a lengthy pause or asking clarifying questions about the survey. Following the protocol analysis, the surveys were further revised and a second protocol analysis was conducted with the revised surveys, using a different sample of the population. The protocol analysis was conducted until it was found no new problems or changes were found. In total, ten supervisors and ten graduates were interviewed. The final product after the protocol analysis is the revised Graduate and Supervisor surveys included in Appendix A and B, respectively.

2. Pilot Testing

Traditionally, after a protocol analysis is conducted, the survey is tested prior to distribution to the target audience. This preliminary testing is called either “pilot testing” or “pretesting” a survey. Phillips recommends conducting a pilot test and analyzing the data to see if any problems arise with the evaluation instrument. (Phillips 1997, p.89) There are several characteristics that have to be evaluated to determine if an evaluation method is effective: validity; content

validity; construct validity; concurrent validity; predictive validity; and reliability. (Phillips 1997, pp.89-92) Conducting a pilot test with the sample audience provides an avenue for evaluation of the instrument. Pretesting is important because often the survey developers miss problems with the instrument because some are too familiar with the material. The developer already understands what the question is supposed to be asking and might not realize that the meaning might be unclear to an outsider. (Edwards, Thomas, Rosenfeld, Booth-Kewley 1997, p.84) Although there is some discussion about what the ideal pretesting sample size should be, Edwards, Thomas, Rosenfeld, and Booth-Kewley, recommend using eight to 12 people per pretesting group. In their opinion, this allows for enough different viewpoints but is a small enough group to be feasible in a short time period. ((Edwards, Thomas, Rosenfeld, Booth-Kewley 1997, p.85)

For the purpose of this thesis, no additional pretest was conducted. This decision was based on two factors: necessity and time. The feedback that was received through the one-on-one interviews in the protocol analysis was extensive and more valuable than tabulated results would have been. Due to the qualitative feedback received in the first protocol analysis, a second set was conducted instead of a pilot test. The survey was revised after the initial interviews and then a second set of interviews were conducted. Time restriction was the second reason an additional protocol analysis was conducted in lieu of pretesting.

IV. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

The objective of this thesis was to develop a way to capture the perceived value of the Manpower Systems Analysis (MSA) curriculum at the Naval Postgraduate School (NPS). The thesis developed two surveys that can be administered to graduates of the MSA curriculum and their immediate supervisors. This last chapter discusses some of the conclusions reached in the research of evaluation methods and recommendations for further study in the area of the evaluation of training and education investments.

1. Types of Metrics to Evaluate Training and Education

Several different methods for measuring the return on human capital investments were discussed in Chapter II. Some of the most common ways to evaluate training and education include: Kirkpatrick's four-level model of evaluation; Phillips' Return-on-Investment (ROI) Model; and Housel and Bell's Knowledge Value Added (KVA) approach. There were also several different forms of instruments that can be used to conduct these evaluations. Although this thesis chose to create two surveys, the process of identifying the perceived value of the MSA curriculum could have also been conducted through a series of interviews or focus groups. The author chose to develop two surveys because the widespread geographic distribution of the target audience would make interviews or focus groups too costly. In addition, the reaction to the MSA curriculum of both the supervisors and graduates is an important aspect of the curriculum's value. The levels of satisfaction, or audience reactions are most easily measured through a survey. This method allows for honest responses without threat of reprisal due to the anonymity of the survey process.

2. Survey

The surveys were developed and then revised through a protocol analysis. Through these series of one-on-one interviews, the author was able to eliminate any biased or leading questions and able to reword questions that proved to be

confusing or ambiguous. The curriculum sponsor, the Strategic Planning and Analysis Directorate (N14), will be able to determine the difference between what is expected in an MSA graduate by their supervisors, and what the graduate learns. Through repeated distribution of the surveys, and revision of the curriculum from the results; the needs of the Navy will be constantly assessed and the curriculum adjusted to meet these evolving needs. The two surveys provide an avenue for this feedback from both the graduates and the supervisors of Manpower Systems Analysis, graduates working in 3130-subspecialty code billets.

3. Protocol Analysis

Elements of a protocol analysis were discussed in Chapter II, and Chapter III discussed specifically the Protocol Analysis that was conducted in this thesis. The Protocol analysis resulted in the rewording or elimination of several of the original survey questions. Some of the changes that were made were simply from an aesthetic or readability standpoint. Other changes were due to misinterpretations of the questions. This occurred when the author intended one question to be asked but the reader understood something different. Most often this resulted in rewording of the question but, on occasion, the question was removed if several people experienced problems with it. Additional protocol analyses were conducted after each revision of the surveys. The author ceased to revise the surveys once the Protocol Analyses process no longer produced changes to be made.

4. MSA Utilization

Other studies have examined utilization of graduate education by designator but no research has been conducted specifically on the MSA curriculum. Through the questionnaires, the resource sponsor, N14, will be able to assess the utilization of 3130 P-and Q-coded personnel. The surveys will provide another method for examining the existing billet structure. An analysis of the results will indicate if the requirements for billets requiring the 3130 P-and Q-coded subspecialty reflect the actual placement of MSA graduates.

B. RECOMMENDATIONS

This thesis only utilizes one method for determining value of the MSA curriculum. Additional evaluation would lead to a more thorough estimation of value. There are four additional areas of study that are recommended for future analysis. The recommendations are based on adding additional survey questions, adding additional target audiences, looking at different methods to measure value, and related topic research.

1. Additional Survey Questions

In an effort to keep the survey brief and to increase the response rate some potentially valuable questions were omitted. Branstetter (2002, p.52) determined that an individual's personal preference for a subject increases their perception of the value of that topic. Because of this finding, it is recommended that the future graduate survey incorporate a "liking" factor. The series of questions that would be required for this evaluation would have made the survey in this thesis much longer than desired. One question was included to capture this information for the entire curriculum by asking the graduate the method by which they were selected to attend NPS. Additional value would be added if the graduate were asked how much they liked or enjoyed each specific topic within the curriculum. A comparison of interest in the topic to their perceived value of each topic might help to explain some of the results.

Previous experiences of both the graduates and supervisors also might influence how the surveys are answered. To fully understand the answers it might be beneficial to add a series of questions to establish previous billets held and experience level of the respondents. Some questions were included to ascertain some of the background of respondents for both the supervisor and graduate surveys. The supervisors were asked to identify their experience level in Manpower, Personnel and Training (MPT) billets and to indicate their designator. Graduates were also asked if they had laterally transferred and, if so, what their previous designator was. For graduates it would be useful to know additional information about their tours prior to receiving graduate education.

Some of this information is derived from their designators, but the extent of their experience or what type of billets they held is not. For example, if the graduate worked in a MPT billet prior to enrolling in the MSA curriculum, his or her previous experience might improve the rate of understanding of the material. For supervisors, the extent of their MPT experience might not be obvious just by asking their subspecialty code. Also, if the officer changed designators, again their experiences might shape their responses differently.

As previously mentioned, these additional questions were not included in the surveys at this time in order to limit the length of the survey. In the future, if analysis of the survey results leads to any unexpected or unexplained results, the surveys could be revised to include these additional questions. While these additional questions are not necessary at this time, they might yield insight into the answers of subsequent surveys.

2. Audience Recommendations

In addition to adding more questions to subsequent surveys, the target audiences could be expanded. The audience recommendations relate to the graduate survey and to additional survey possibilities.

a. Graduates

Currently, the graduate survey is targeted only for active duty Navy officers who graduated from the curriculum between 1996 and 2004. To increase the population size and allow for more feedback on the curriculum, this target could be expanded. The date of graduation could be expanded to include graduates six months after graduation. According to Kirkpatrick (1998b, p.55), some people change immediately and others take up to six months to adapt what they learned. Waiting six months after graduation allows the graduates sufficient time to become acquainted with their jobs, but is still recent enough to gain valuable recent feedback. Several questions are asked of the graduates to determine graduation date and to gauge MPT experience. After the results are collected, the demographic information could be used to further divide the data into separate demographic categories, such as the length of time since

graduation. This would allow for the results to be excluded if it was determined that the new graduates are too inexperienced for the purpose of the study.

There are several ways to change the target population for the graduate survey. The survey could be developed for all MSA graduates, including non-Naval and international students. This type of survey would need to be rather lengthy and it could be very difficult to find contact information for everyone, especially the international students. A more feasible change would be to survey all US students, including each Service and DoD civilian students. Another recommendation would be to develop a survey for all US students serving in MPT billets. This would provide the most relevant responses. Adding this additional audience would require a longer survey and more details on the Marine Corps' follow-on billets.

Another additional possible audience for the graduate survey would be to include retired and separated graduates. The survey could be adjusted to include how relevant the MSA curriculum has been to their civilian career. Adding this additional segment to the target population could provide some valuable retention information. To target this segment of the population, it would be preferential to develop a separate survey than the one administered to active duty graduates, to limit the length of both surveys. Unfortunately, it is difficult to find contact information for personnel who have separated from the military; therefore, responses might be limited to those who joined the reserves. However, the reserves represent a highly selected population and restricting the group in this way could bias the results, because it does not portray the preferences of the entire separated population.

b. Additional Survey

According to Kirkpatrick (1998b, p.1), the supervisor is not always the best person to conduct an evaluation. Other individuals in the workplace might also be ideal evaluators. Using the 360-degree evaluation theory, additional surveys could be developed to provide a more rounded observation of the graduate. For example, A survey could be developed for peers of the MSA

graduates. This would provide an evaluation from another aspect of the organization.

3. Alternate Evaluation Methods

Two surveys are developed by this thesis to evaluate the MSA curriculum. Several additional methods for evaluating training and education effectiveness are introduced in Chapter II by Carnevale and Schulz (1990, p.246). Due to the geographic distribution of the target audience, surveys are a more feasible way to get a large response. According to Kirkpatrick (1998b, p.52), interviews are a great method for obtaining additional information yet are very time consuming. If additional resources and time are available, interviews could also be very helpful in measuring value of the curriculum. To limit the cost, interviews could be conducted in a few MPT billet concentration areas such as Millington, TN and Washington, DC. These two areas would provide the largest number of graduates and supervisors in a close proximity. (USN 2005b)

4. Additional Value Measuring Methods

Several different methods for measuring value of education and training were introduced in Chapter II. Many of these studies could be adapted to the MSA curriculum.

a. Return on Investment

Phillips (1996) introduced return on investment (ROI) as the fifth level of evaluation to measure the value of education and training. A study conducted by Bowman and Mehay (2004) determined the ROI of graduate education using Navy Surface Warfare Officers. A recommendation for future study would be to measure ROI for the MSA curriculum. Although Bowman and Mehay (2004) determined the return on investment for Navy-funded graduate education, the results are not specific to the MSA community and further study might prove valuable.

b. Determining Costs of the MSA Curriculum

An additional recommendation is to determine the cost of the MSA curriculum. Eckardt (1997) developed a series of equations to determine the cost of a degree program and the marginal cost of enrolling additional students in

the program at NPS. The values for both the cost per student and the marginal cost differ by curricula. (Eckardt 1997, p.84) The equations Eckardt established were based on the Financial Management curriculum but could be adapted for the MSA curriculum. Cost estimates will be needed to determine the financial return on investment.

c. Knowledge Value Added

Housel and Bell (2001) introduced the Knowledge Value Added (KVA) approach to measure the value of knowledge in an organization. Branstetter (2002) applied the concept to determine the value to the Marine Corps of the knowledge learned through the Information System Technology (IST) Curriculum. A recommendation for future study would be to apply the same techniques to the MSA curriculum. Conducting a KVA analysis for the MSA curriculum would yield standardized units of knowledge for comparison in different billets. A comparison of costs could then be conducted between the MSA curriculum, other fully-funded graduate education programs, and partially-funded or off-duty graduate education programs (via, for example, tuition assistance) using standardized units for knowledge and skills.

5. Related Topic Research

The final recommendation for additional research is to develop similar surveys for other curricula at NPS. Although the objective of this thesis was to develop instruments to be used for the MSA curriculum, the surveys developed in this thesis could easily be adapted for other curricula. An initial place to begin would be to apply the surveys to other MPT-related curricula such as Operations Analysis and the Human Systems Integration programs at NPS. The surveys developed would be ideal for both of these curricula because the 1200 community sends officers to both of these curricula and its graduates are often sent to Manpower, Personnel, and Training billets.

With a combination of the two surveys and these different methods, the value of the MSA curriculum could be determined from all aspects of evaluation. The graduate survey provides the perceived value of the curriculum, Kirkpatrick's

(1971) reaction, or first level of evaluation. The supervisor survey provides some insight on the learning or behavior levels at the second and third-levels of evaluation. Looking at retention and promotion benefits of the curriculum provides an evaluation from the results based, or fourth level of Kirkpatrick's (1971) evaluation. A return-on-investment analysis of the curriculum encompasses Phillips' (1996) fifth level of evaluation. Using the Knowledge Value Added approach measures the value of the knowledge to the organization. Conducting a combination of these different methods would yield a more thorough understanding of the value of the curriculum.

APPENDIX A: GRADUATE SURVEY

You have been identified as having attended the Naval Postgraduate School (NPS) in the Manpower Systems Analysis (MSA) Curriculum. Upon completion, you received a 3130P-subspecialty, as a Manpower Systems Analyst. Upon completion of your follow-on tour, your subspecialty becomes a 3130 Q.

Thank you for taking the time to complete the following survey about your experience as a student in the Manpower Systems Analysis (MSA) Curriculum at the Naval Postgraduate School (NPS).

The goal of this survey is to measure the perceived value of the MSA Curriculum and whether the curriculum provided you a foundation for your follow-on billets. We appreciate any insight you can share that will enable us to improve the quality of the MSA curriculum, ensure its continued relevancy, and further improve the reputation of your alma mater. Thank you in advance for your participation.

The survey is entirely anonymous. The demographic questions are for statistical analysis only.

1. When did you graduate from NPS (Month & Year)? _____

2. What was your paygrade when you completed the MSA curriculum?
   a) O-2
   b) O-3
   c) O-4
   d) O-5

3. What is your current designator? _____

4. Did you laterally transfer into this community?
   a) Yes.
   b) No.

   If yes, what was your previous designator? _____

5. Did you have a post-baccalaureate degree before enrolling at NPS?
   a) Yes
   b) No

6. Describe your application/selection process to attend NPS?
    a) I requested to attend
    b) I had to apply and be selected by a review board
    c) Sent by Detailer, no choice
    d) Other

    If other, please explain. _____

    _____

7. Which degree did you receive while at NPS for the MSA Curriculum?
    a) Master of Science in Management (MSM)
    b) Master of Business Administration (MBA)

8. After receiving your MSA degree, have you filled or are you currently filling a 3130 P- or Q-coded billet? If so, for how long were you or have you been in that billet (in closest month)?

a. 3130 P	No	Yes	For how long?
b. 3130 Q	No	Yes	For how long?

9. If your current or previous billet is/was not P-or Q-coded, will it meet your subspecialty code payback requirement?
    a. Yes
    b. No
    c. Unknown

10. How would you rate the MSA curriculum in preparing you for your manpower follow-on billets?
    a) Very Effective
    b) Effective
    c) Ineffective
    d) Very ineffective
    e) N/A, I have not yet filled a manpower follow-on billet

    If you answered other than “A,” what was missing from the curriculum? _____

    _____

11. How did you select your thesis topic?
    a) Provided by MSA Faculty
    b) Sponsored by external source (please indicate who your sponsor was)
    c) Self-selected
    d) Provided by other NPS Faculty/Staff
    e) Current or Previous Student (Follow-on thesis)
    f) Other

    If other, please explain how you selected your topic: _____

    _____

12. How would you rate the overall relevance of your thesis topic to your jobs/career after departing NPS?
    a) Very Relevant
    b) Relevant
    c) Somewhat relevant
    d) Not relevant at all

    If you answered other than "A," please explain why. _____

    _____

13. To what extent do you believe interaction with DoD military and civilian students, as well as international students in the MSA curriculum, added any value to your military career?
    a) To a very great extent
    b) To a great extent
    c) To a small extent
    d) To no extent

    If you answered other than "A," please explain why. _____

    _____

14. To what extent was the curriculum effective in covering current military manpower issues (current at the time you were enrolled)?
    a) To a very great extent
    b) To a great extent
    c) To a small extent
    d) To no extent

    If you answered other than "A," please explain why. _____

    _____

15. How did the MSA curriculum at NPS improve your skills in quantitative Data Analysis and in the application of analytical tools?
    a) To a very great extent
    b) To a great extent
    c) To a small extent
    d) To no extent

    If you answered other than "A," please explain why. _____

    _____

16. How did the MSA curriculum at NPS improve your knowledge in Manpower Systems Analysis Fundamental Concepts (Manpower, Personnel & Training)?
    a) To a very great extent
    b) To a great extent
    c) To a small extent
    d) To no extent

    If you answered other than "A," please explain why. _____

    _____

17. How did the MSA curriculum at NPS improve your knowledge in Manpower Systems Analysis Policy Analysis (identifying strengths and weaknesses of proposed policies and identifying alternatives)?
    a) To a very great extent
    b) To a great extent
    c) To a small extent
    d) To no extent

    If you answered other than "A," please explain why. _____

    _____

18. If you received an MBA from this program, would you still have entered the curriculum if the Masters of Science were the only choice (assuming you had a choice)?
    a) Yes
    b) No
    c) N/A, I received a Master of Science (MS) degree.

    If no, please explain why. _____

    _____

19. Would you recommend attendance at NPS in the MSA curriculum to others?
    a) Yes
    b) No

    If no, please explain why. _____

    _____

    _____

20. As an Alumnus, what have you found the most valuable about your MSA experience as it relates to your Navy Career? _____

    _____

    _____

21. Are there any changes or additions you would recommend for the MSA Curriculum that you have not yet mentioned? _____

    _____

    _____

22. Please include any other remarks you would like to make about the MSA curriculum or your experience at NPS. _____

    _____

    _____

APPENDIX B: IMMEDIATE SUPERVISOR SURVEY

You have been identified as having administrative/operational responsibility of at least one billet that requires a graduate degree (3130P) or graduate degree and follow-on tour experience (3130Q) as a Manpower Systems Analyst.

We would appreciate your taking the time to answer the following survey about your Manpower Systems Analysis (MSA) graduate(s) from the Naval Postgraduate School (NPS).

The goal of this survey is to measure the perceived value of the MSA Curriculum. We appreciate any insight you can share that will enable us to improve the quality of the MSA curriculum, ensuring its continued relevancy to meet the needs of the Navy. Thank you in advance for your participation.

The survey is entirely anonymous. The demographic questions are for statistical analysis only.

1. To what officer category do you belong?
   a) Unrestricted Line
   b) Restricted Line
   c) Staff Corps
   d) Civilian
   e) Other (please specify) _____

2. What is your paygrade?
   a) O-3
   b) O-4
   c) O-5
   d) O-6
   e) O-7
   f) GS-10
   g) GS-11
   h) GS-12
   i) GS-13
   j) GS-14
   k) GS-15
   l) SES

3. If you have the Manpower Systems Analyst 3130-subspecialty, which level subspecialty do you have?
   a) 3130 P (Subspecialist)
   b) 3130 Q (Proven Subspecialist)
   c) 3130 S (Significant Experience)
   d) 3130 R (Significant Experience Proven Subspecialist)
   e) N/A

4. Please select the Navy Officer Billet Classification groups of the 3130-coded officers you supervise. (Select all that apply).

   <u>Health Care Services Field:</u>
   a) Health Services Management Group
   b) Health care services Group
   c) Nursing Group

   <u>Personnel Field:</u>
   d) Recruitment and Selection Group
   e) Classification and Distribution Group
   f) General Training Group
   g) Human Resource Management Group
   h) Performance Group
   i) Welfare Group
   j) General Group
   k) Other – not listed (Please list) _____

5. How many 3130 P-or Q-subspecialty officers do you have working for you?

6. Are there any billets under your direction that are not 3130 P-or Q-coded that you feel should be?
   a) Yes
   b) No
   If you answered yes, please explain why it should be a P-or Q-coded billet.

   _____

   _____

   _____

7. Compared to a Q-coded (proven)-subspecialist, at what proficiency level would you say your MSA graduate was upon arrival?

   0%----|----20%----|----40%----|----60%----|----80%----|----100%

8. About how many months does it usually take for the MSA graduate to reach the proficiency of a 3130Q-subspecialist (proven)?

a. 0-3 mo.	e. 13-15 mo.	i. 25-27 mo.
b. 4-6 mo.	f. 16-18 mo.	j. 28-30 mo.
c. 7-9 mo.	g. 19-21 mo.	k. 31-33 mo.
d. 10-12 mo.	h. 22-24 mo.	l. 34-36 mo

9. Have the 3130P-subspecialty officers who have worked for you in the past, or are working for you now, arrived with the skills necessary to enable them to perform their job sufficiently?
   a. Yes
   b. No.
   If not, what skills are the MSA graduates missing?_____

   _____

   _____

10. In your current or previous supervisory positions, how would you compare the job performance of MSA graduates with other officers who hold a master's degree?
    a. Much better prepared than other graduates
    b. Somewhat better prepared than other graduates
    c. About the same as other graduates
    d. Somewhat less prepared than other graduates
    e. Much less prepared than other graduates

11. In your current or previous supervisory positions, how would you compare the job performance of MSA graduates with other officers who don't have a master's degree?
    a. Much better prepared than non-graduates
    b. Somewhat better prepared than non-graduates
    c. About the same as non-graduates
    d. Somewhat less prepared than non-graduates
    e. Much less prepared than non-graduates

12. Would you request an MSA graduate from NPS for any non-subspecialty-coded billets over other master's graduates if you could?
    a. Yes, I would prefer an MSA graduate degree
    b. I'm neutral. I will take any graduate degree
    c. No, I would prefer another graduate over an MSA graduate degree
    d. N/A, graduate education is not needed.

    If no, please explain why and who you would prefer: _____

    _____

    _____

    _____

13. Is there anything about your NPS MSA graduate that stands out from other officers you have worked with?

    _____

    _____

    _____

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